

**Exploring State Childhood Immunization Practices**

**by**

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## **ABSTRACT**

This Applied Research Project is an exploratory study of Texas' immunization policies. The purpose of this research project is threefold. First, is to establish a model approach, based on relevant literature, of model policies that help improve immunization rates in a state. The model approach is referred to as a practical ideal type. The second purpose of this applied research project is to compare the model approach of state immunization policies to the current childhood immunization infrastructure in Texas. The third purpose is to make recommendations for Texas based on the model approach and the results of the data analysis.

Document analysis, content analysis, and an interview were used to collect data and satisfy the research purposes. Texas' immunization infrastructure partially meets the suggestions of the practical ideal type. Texas meets all the requirements for Provider-Based Interventions, and only meets some of the requirements to increase Community Demand and Access to Vaccinations.

Recommendations on how Texas can improve its immunization infrastructure include

- (1) Texas ImmTrac registry should become an "opt-out" registry,
- (2) Texas Legislature should pass legislation to mandate the missing three components of a functional immunization registry,
- (3) Educational materials should include the importance of an up-to-date immunization record,
- (4) School vaccination requirements should meet the ACIP requirements, and
- (5) Texas Legislature should pass legislation that requires insurance coverage for all ACIP-recommended immunizations.

## TABLE OF CONTENTS

<b>CHAPTER 1. INTRODUCTION.....</b>	<b>6</b>
Research Purpose.....	6
Table 1.1 – Introduction of Immunization Interventions.....	7
Importance of Study.....	8
Chapter Summaries.....	8
<b>CHAPTER 2. SETTING.....</b>	<b>11</b>
Introduction to the National Immunization Survey.....	11
Legislative Environment in Texas.....	12
<b>CHAPTER 3. LITERATURE REVIEW .....</b>	<b>17</b>
Purpose.....	18
Importance of Childhood Immunizations.....	19
Immunization Interventions.....	20
Immunization Infrastructures.....	22
Conceptual Framework.....	23
Intervention One.....	24
Intervention Two.....	32
Intervention Three.....	38
Summary.....	41
Table I – Conceptual Framework.....	42

**CHAPTER 4. METHODOLOGY.....45**

Table 4.1 – Linking Intervention One to Data Analysis..... 46

Table 4.2 – Linking Intervention Two to Data Analysis..... 48

Table 4.3- Linking Intervention Two to Interview Questions..... 50

Table 4.4- Linking Intervention Three to Data Analysis.....50

Research Technique and Methodology.....51

Protocols..... 53

Human Subjects Protection.....54

**CHAPTER 5. RESULTS.....56**

Limitations of the Study..... 56

Results for Intervention One.....56

Table 5.1 – Results for Intervention 1.1..... 58

Table 5.2 – Results for Intervention 1.2..... 62

Table 5.3 – Continued Results for Intervention 1.2.....63

Table 5.4 – Continued Results for Intervention 1.2.....66

Table 5.5- Results for Intervention 1.3..... 69

Results for Intervention Two..... 69

Table 5.6 – Results for Intervention 2.1..... 70

Table 5.7 – Interview Responses for Intervention 2.1..... 72

Table 5.8 – Results for Intervention 2.2..... 73

Table 5.9 – Results for Intervention 2.3..... 75

Results for Intervention Three..... 77

Table 5.10 – Results for Intervention 3.2..... 77

Summary.....78

**CHAPTER 6. CONCLUSION.....80**

Summary of Weaknesses..... 80

Table 6.0 – Results of the ARP.....82

Table 6.1 – Summary of Recommendations for Texas.....85

## Chapter I – Introduction

According to the Centers for Disease Control’s National Immunization Survey, Texas has repeatedly ranked lower than the national average for immunization rates of two-year-olds. Texas’ legislature addressed the low immunization rates by passing legislative requirements for childhood immunization policies. When legislation is passed, it is then the job of the State Health Department’s offices to interpret the legislation and adopt rules to enforce the legislation. It is this procedure and these policies made by the legislature and interpreted by the state health department that shapes the immunization environment in a state. This applied research project argues that state immunization policies should be assessed to ensure that every child has the opportunity to be immunized.

### **Purpose**

The purpose of this research project is threefold. First, it is to establish a model approach, based upon the literature, of policies that help improve immunization rates in a state. The model approach is referred to as a practical ideal type<sup>1</sup>. The practical ideal type of this applied research project recommends components that are grouped into three main immunization intervention categories, according to a study conducted by Briss et al. of effective immunization interventions (2000). The study was also cited by the Institute of Medicine’s *Calling the Shots*, a book of recommendations for immunization policies and practices. The three categories of immunization interventions are listed on Table 1.1.

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<sup>1</sup> A practical ideal type “can be viewed as standards or points of reference” (Shields 1998, 219).

**Table 1.1**

<b>Immunization Intervention</b>	<b>Description</b>	<b>Measurement</b>
1. Community Demand for Vaccinations	Interventions that are designed to increase knowledge regarding vaccinations.	Content and Document analysis
2. Access to Vaccination Services	Interventions that are designed to reduce the costs of vaccinations or increase the convenience of receiving vaccinations.	Content analysis, document analysis, and interview
3. Provider-based Interventions	Interventions that are implemented through a health-care setting with the goal for doctors to not miss any opportunities for vaccinations.	Document analysis

In the practical ideal type, each of the three interventions is broken down into measurable components that are also based on literature. The components are comprised of recommendations from Briss, et al., the Centers for Disease Control, the Immunization Policy Operations Manual, National Vaccine Advisory Committee, and the Advisory Committee on Immunization Practices (ACIP).

The second purpose of this applied research project is to compare the model approach of state immunization policies to the current childhood immunization infrastructure in Texas. Data analysis is conducted using document analysis, content analysis, and an interview.

The third purpose is to make recommendations for Texas based on the model approach and the results of the data analysis. The recommendations are made in response to Texas' current low childhood immunization rates.

## **Importance of Study**

This study is important for two reasons. Immunizations “are one of medicine’s greatest achievements” (TIP 2002, 2). Without the medical miracle of vaccinations, millions of children and adults would die from diseases that are currently vaccine-preventable. “Along with a clean water supply, vaccines are one of the most important public health interventions for preventing disease” (TIP 2002, 2). Medical literature identifies vaccinations as important public health measures, and therefore, vaccinations should be a priority to public state officials. Immunization interventions should be well thought out and organized in order for them to be effective.

Second, a careful and fair assessment of Texas’ immunization infrastructure should be conducted. Often times political pressures and special-interest groups interfere with legislative actions. This applied research provides an unbiased look at the Texas immunization infrastructure and makes recommendations based strictly on extensive literature regarding immunization interventions.

## **Outline for Applied Research Project**

The next five chapters that follow include:

- Discussion of the research setting, including a description of the National Immunization Survey which is the survey that identifies Texas’ low immunization rates and the legislative environment at the time this applied research project was written.
- Review of the research literature pertaining to immunization interventions. Three main immunization interventions are discussed. The conceptual framework that guides this applied research project is presented and discussed.



- Discussion of the methodology that guided the data collection for this study. The data collection methods were guided by the conceptual framework. The data analysis methods used are document analysis, content analysis, and an interview.
- Description and discussion of the results obtained from the data analysis.
- Summary of the findings and recommendations to improve Texas' immunization infrastructure.

The next chapter, which covers the research setting, describes the National Immunization Survey and the current legislative environment in Texas concerning immunizations.



## Chapter II – Setting

The purpose of this chapter is threefold: (1) to provide an overview of the National Immunization Survey<sup>2</sup> (NIS); and (2) to describe the legislative environment in Texas concerning immunization policies.

### National Immunization Survey

The Childhood Immunization Initiative (CII) was established during the Clinton administration as a top priority. The CII addresses five goals:

1. To improve the quality and quantity of immunization services
2. To reduce vaccine costs for parents
3. To increase community participation, education and partnerships
4. To improve systems for monitoring diseases and vaccinations
5. To improve vaccines and vaccine use.

The United States Congress has addressed each of these five points by increasing funding or by initiating programs in an effort to improve immunization coverage in the United States.

One method that is used to implement the goals of the CII is the National Immunization Survey. The National Immunization Survey (NIS) has been used since 1994 to provide immunization coverage information to the fifty states, Washington, D.C., and to twenty-eight large urban areas (CDC 2000). The NIS is used to satisfy goal number four of the Childhood Immunization Initiative: improving systems for monitoring diseases and vaccinations. “The NIS provides an early warning system for potential problems and monitors the introduction of new vaccines into the recommended childhood

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<sup>2</sup> The NIS is a survey that is used to estimate immunization coverage in states among children 19-35 months.

immunization schedule” (CDC 2000). The NIS is also used to assess the progress toward the Childhood Immunization Initiative’s other four goals.

The National Immunization Survey consists of two parts. The first is a public telephone survey, and the second is a survey of vaccination providers. Initially, households are randomly selected through a telephone bank and asked about immunization information for any and all children in the household between 19 and 35 months of age. The survey then asks for parental permission to contact the child’s medical provider. Once the medical provider is contacted, he or she is asked to provide immunization records for the child being surveyed. Once the immunization records are received, the NIS compares the vaccination doses that the child has received to the doses that are recommended by the Advisory Committee on Immunization Practices (ACIP). “The sample is weighted to represent the population of children 19-35 months old during a particular calendar year” (Barker et al. 2000, 606). Estimates of vaccination coverage levels are calculated quarterly and are used to estimate immunization rates and identify states with the highest and lowest rates<sup>3</sup>.

### **Legislative Environment**

In 2002, the NIS identified Texas as one of the states with the lowest immunization rates with 71 percent coverage in children 19-35 months of age. Texas’s low immunization rates are not significant to the year 2002. Texas has continued to rank below the national average for vaccine coverage (TIP 2002). Texas’s low percentage of immunization coverage initiated the creation of a state immunization plan called “Immunizing Texas: A State Plan to Increase Immunization Rates in Texas.” The state

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<sup>3</sup> Barker, et al., 2005, warn that the NIS should not be used to create exact rankings between states because of the 5% margin of error. Instead, the NIS data should be used to estimate the states’ immunization coverage.

immunization plan was written by the Texas Immunization Partnership, a statewide partnership made up of representatives in the former Texas Department of Health, organized medicine, consumer and parent groups, and the pharmaceutical industry (TIP 2002).

The Texas Immunization Partnership and *Texas' State Plan to Improve Immunization Coverage* identify barriers<sup>4</sup> and successes of Texas' immunization policies. The state plan also gives recommendations for changes that can improve Texas' immunization rates. The recommendations made by the state plan helped to initiate immunization legislation in 2003, which was passed by the 78<sup>th</sup> Texas Legislature.

Five bills were passed in the Texas House of Representatives and the Texas Senate with the intent of improving Texas' low immunization rates. H.B. 1920 improves physician access to immunizations by simplifying the enrollment procedures of the Vaccines for Children grant program. H.B. 1921 was passed to improve the Texas Immunization Registry, ImmTrac. The legislation gave the Department of State Health Services (DSHS) Immunization Branch authority to improve the registry and therefore make it functional. The DSHS was also given the authority to monitor the parental consent forms in the "opt-in" Texas registry. S.B. 40 requires the DSHS to create and sustain an education program for the public about the importance and safety of immunizations. S.B. 43 required that the DSHS report the results of a pilot program to the Texas Legislature by October 1, 2005. The pilot program was conducted in Houston to educate physicians regarding the importance of raising childhood immunization rates.

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<sup>4</sup> Stakeholders that attended the Texas Immunization Partnership meetings identified barriers in Texas that prohibit it from having successful immunization rates. Some barriers include lack of knowledge by parents and providers, inadequate reimbursement for vaccinations to providers, vaccine shortages, concerns about vaccine safety, inadequate transportation to clinics, clinic accessibility and language/cultural issues.

Finally, S.B. 486 requires the DSHS to develop public-private partnerships to increase awareness of childhood immunizations.

Following the 78<sup>th</sup> regular legislative session, Texas Governor Rick Perry signed Executive Order RP 25 on July 31, 2003. The Executive Order requires that the Department of State Health Services expedite the implementation of the immunization legislation that was passed by the 78<sup>th</sup> Texas Legislature.

### **Summary**

The National Immunization Survey is used to estimate vaccination coverage in the fifty states, Washington, D.C., and in twenty-eight urban areas. The NIS results assist state health officials in “prioritizing needs and developing appropriate public health strategies” (Barker et al. 2005, 605).

The NIS continues to report that the Texas immunization data put Texas in the lower tier of states according to immunization rates. Therefore, the Texas Immunization Partnership was formed and the “State Plan to Increase Immunization Rates in Texas” was written to provide recommendations for improving Texas’s immunization rates. The recommendations helped to initiate five new pieces of legislation that were passed during the 78<sup>th</sup> Texas Legislature. The legislation was passed with the intent to improve immunization coverage in Texas.

Whether or not the new legislation has helped to increase Texas immunization rates is yet to be seen. The National Immunization Survey measures the immunization rates of children born two or three years prior to the time in which the rates are actually released to the public. For example, 2004 NIS results provide immunization data on children that were born between February 2001 and May 2003. Therefore, the impact of

the legislation passed in 2003 will not be able to be examined until the 2006 NIS, which is released in August of 2007.

There are other methods to determine whether Texas's recent efforts to increase its low immunization rates have been effective. Literature is available which identifies the most effective immunization policies for a state to implement. The following chapter discusses and reviews the literature surrounding effective state immunization policies and forms the practical ideal type using the literature.





## Chapter III - Literature Review

There are many deadly diseases that can be contained and prevented with vaccinations. However, in order for vaccinations to work to their potential, more than a majority of the population has to be immunized. Without a largely immunized population, epidemics can break out and cause deaths. In 1989, a measles epidemic broke out with a reported 55,000 cases and was responsible for 11,000 hospitalizations and 123 deaths in the United States (Bumpers et al 2004, 11). Research has shown that the measles epidemic of 1989-1991 was most prominent in the low-income areas of the United States that had only 50 percent of their school-aged children immunized (Bumpers et al. 2004, 11). “The measles outbreak of 1989-1991 exposed many incorrect assumptions behind the belief that low levels of coverage were sufficient to control the transmission of infectious disease” (IOM 2000, 109).

Another disease that can be deadly if not contained with immunizations is influenza. An influenza pandemic in 1918 caused one million deaths in the United States (Barry 2004). Influenza also causes significant deaths each year (Barry 2004, 4). “In an average year, the flu causes 36,000 deaths and 114,000 hospitalizations in the United States” (Bumpers et al. 2004, 11). The H5N1 virus, or bird flu, is another important influenza concern. Currently, the United States federal government is making plans to gather stockpiles of Tamiflu, the drug that is expected to provide protection from the deadly disease (Adler 2005, 43).

The state of Texas has poor overall immunization levels.<sup>5</sup> Texas has continually ranked below the national average (TDH 2003b). Texas’s immunization level estimates

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<sup>5</sup> According to the National Immunization Survey, Texas’s immunization levels were estimated the 45<sup>th</sup> lowest among the 50 states in the 2002 vaccination coverage levels. (TDH 2003b).

dropped to 48<sup>th</sup> out of the 50 states in 2004, just ahead of Oklahoma and Nevada (Udall and Annear 2005). The City of Houston has one of the lowest vaccination coverage levels in the country (64% in 2002, compared to the national average of 79%). States that rank below the national average, like Texas, Oklahoma, and Nevada should be concerned with the health of their states' children and should take steps to improve their immunization interventions and coverage levels.

### **Purpose**

Vaccinations can and will prevent deadly diseases if large parts of the population are immunized in all areas. State and federal governments have a joint responsibility to see that vaccines are purchased and supplied. In order to ensure the use and accessibility of immunizations, governments should intervene to improve the immunization rates among populations.

The purpose of this literature review is to examine the literature surrounding the role that state governments should play in childhood immunization interventions, to identify the most effective childhood immunization interventions for increasing childhood immunization coverage rates, and to provide background information for each intervention.

The literature review explains (1) the importance of childhood immunizations; (2) the definition and role of an immunization intervention; (3) the definition of and importance of a strong state immunization infrastructure; and (4) the conceptual framework that identifies, through a practical ideal type, recommended interventions to be used in order to increase state childhood immunization rates.

### **Importance of childhood immunizations**

The practice of vaccinating children is a testament to the medical community's commitment to obtaining a high level of immunization coverage. Pediatricians continue to distribute and pharmaceutical companies continue to manufacture immunizations regardless of the fact that they make very little money from the practice (Bumpers et al 2004). Pediatricians often lose money every time they give a vaccination because of high administrative costs. Regardless, they still administer vaccinations because they believe in the importance of and the value that vaccinations play in our communities (Bumpers et al. 2004, 14). As pediatricians lose money by administering vaccinations, so do the manufacturers of the vaccines, as the sale of other prescriptions is much more lucrative (Bumpers et al. 2004, 14).

The effectiveness of childhood immunizations can actually be measured and proven by the amount of disease outbreaks throughout the country. The last half of the twentieth century has demonstrated some success of childhood immunizations. The United States has experienced a decline of greater than 95 percent in most vaccine-preventable childhood diseases<sup>6</sup> (Briss et al. 2000, 97). The United States is not the only country to benefit from vaccination coverage. Smallpox has actually been eliminated worldwide, and polio, measles, pertussis, and diphtheria are currently at all-time lows (Bumpers et al. 2004, 5).

Government-funded medical entities benefit from vaccinations because the vaccinations act as preventive medicine. Texas saves 23 dollars per child in direct and indirect costs that would occur if the vaccine-preventable diseases were to infect children (TMA 2002, 2). A Centers for Disease Control cost-benefit analysis demonstrated that for

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<sup>6</sup> Even though there has been a 95 percent decline in most vaccine-preventable diseases in the United States, there are still more than 400,000 cases of illness and more than 30,000 deaths each year in the United States that are caused by vaccine-preventable diseases (Briss et al. 2000, 97)

every dollar spent on immunizations, \$6.30 are saved on direct medical costs, “with an aggregate savings of \$10.5 billion” (Bumpers et al. 2004, 8).

Immunizations save money in direct and indirect medical costs because vaccinations protect both the individual and the population as a whole from the disease. This is called the “herd effect” (Bumpers et al. 2004). The herd effect explains how vaccinations protect citizens from the diseases passing from one person to another (Briss et al. 2000, 98).

### **Immunization interventions**

The importance of childhood immunizations is apparent in the medical research<sup>7</sup>. However, even though the life-saving vaccinations exist, every child does not have the same access to them. Ensuring immunization access to children in lower-income areas is more difficult than ensuring immunization access to children with private health insurance. In the case of the United States, there are steps that state governments can take to make progress towards providing immunization coverage for the children in lower-income and hard-to-reach areas. The steps that a state can take to improve childhood immunization rates are called interventions.

There has been a recent shift in immunization practices from public medical providers to private medical providers. The majority of patients in this country are being seen and immunized in private healthcare facilities as opposed to the public healthcare

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<sup>7</sup> American Academy of Pediatrics. 2003. Committee on community health services and committee on practice and ambulatory medicine. Policy Statement. *Pediatrics* 112(4):993-996

Bumpers, Betty et al. 2004. Closing the vaccination gap: a shot in the arm for childhood immunization programs. *Every Child by Two Organization Issue Report*. Washington, D.C.

Briss, P. A., S. Zaza, and M. Pappionau. 2000. Reviews of evidence regarding interventions to improve vaccination coverage in children, adolescents, and adults. *American Journal of Preventive Medicine* 18(1S):97-140

Institute of Medicine (IOM). 2000. *Calling the shots*. Washington D.C.: National Academy Press

facilities that were popular in the past. The wide use of private healthcare facilities has changed the role that the public sector plays in the immunization of children. The public sector once played the role of the medical provider. The public sector clinics were once the primary providers of immunizations and other healthcare. Now the government plays the role of administrator. The public sector's role is more to create and enforce regulations on the private sector medical providers. The health and safety of the states' citizens is ultimately the responsibility of the states' governments. "Because states are the ultimate stewards of public health, they are responsible for delivering services to those whose immunization needs are not met by the private sector" (IOM 2000, 11). Regardless of the shift from the public clinics to the private clinics, it is the responsibility of the state to ensure that all children are immunized.

According to the Institute of Medicine (2000), a state government's two new roles in childhood immunization are assessment and assurance. The new roles of assessment and assurance include interventions that will increase immunization coverage and therefore secure the health and safety of a state's citizens. Immunization interventions involve assessing coverage, documenting immunization rates, and any other assessment intervention that will improve immunization practices by private sector medical providers. "Since the delivery of immunization services has shifted from the public to the private sector over the past decade, careful attention will need to be focused on ways to gather and compare data on immunization status, vaccine coverage benefits, and service delivery costs from both public and private health insurance plans" (IOM 2000, 149).

Policy development is another new role for state government health agencies (IOM 2000). Policies will have to be made that have all communities in mind when it

comes to immunization coverage (IOM 2000). There will have to be specific policies that target underserved areas where immunization coverage is low and vaccine-preventable diseases are most likely to break. For instance, according to the Centers for Disease Control, immunization rates for African-American areas are the lowest (Bumpers 2004, 11). The United States' experience with the 1989-1991 Measles epidemic should have made our nation well aware that all areas of the country should have high immunization coverage in order to prevent another severe outbreak of any kind. The heightened awareness should lead to policy-making with regard to low-immunization areas.

### **Immunization infrastructures**

In order for immunization interventions to be successful in improving childhood immunization rates, each state must have what is called a strong immunization infrastructure (IOM 2000). The Webster's Dictionary defines infrastructure as "the underlying foundation or basic framework." Webster's definition is similar to the definition of an immunization infrastructure. "In the context of this study, infrastructure encompasses the formal set of arrangements that guide the immunization system in the United States" (IOM 2000, 104).

The immunization infrastructure must exist because merely providing vaccines does not ensure high vaccination levels. The fact that a state provides funding for the purchase of vaccines does not mean that there will be high levels of immunization coverage in every area of the state (IOM 2000, 104). There must be an infrastructure that supports interventions to increase immunization coverage. The difficulty of ensuring high immunization coverage levels is apparent in the fact that twenty-six out of fifty

states in the United States have immunization coverage levels below 80 percent (Bumpers 2004, 9).

There are numerous reasons why it is difficult to maintain high immunization coverage levels. First, there is a daily birth cohort in the United States of 11,000 children that need to be immunized (IOM 2000, 104). There is also a growing immigrant population that can be considered hard-to-reach because most do not speak English (IOM 2000). Other challenges to immunization coverage can be the lack of parent education on immunizations, the lack of health insurance, the lack of personal funds to pay for the immunizations, among others. Overcoming these obstacles requires more than just the purchase and delivery of vaccines. There must be a strong immunization infrastructure that supports effective immunization interventions.

### **Conceptual Framework**

A practical ideal type was developed to serve as the conceptual framework. The practical ideal type recommends a set of best practices to be used to improve immunization coverage levels. Each recommendation is based on literature and how effective each intervention is in supporting a strong immunization infrastructure. According to Shields and Tajalli, (2005, 25), a “practical ideal type is just the best components that the student could find after engaging in a careful review of the literature tempered by their experience.” This applied research project’s model of state immunization best practices is separated into three components that support high immunization coverage levels. Each component is linked to criteria that will be used to compare how close the Texas immunization infrastructure is to the intervention components of the practical ideal type. Those components are (1) community demand,

(2) access to vaccination services, and (3) provider-based interventions (Briss et al. 2000, 98).

### **Intervention One**

**Community Demand.** In order for a state to improve its immunization coverage, there must be a demand for vaccinations in the state. To increase community demand in a state, immunization interventions must be in place to educate and increase knowledge about the importance and safety of immunizations (Briss et al. 2000, 100).

Misperceptions can develop if there is not enough education about immunizations (Bumpers et al. 2004, 17). One misperception that can formulate is that the public and medical providers take immunizations for granted. “Studies show that recipients often undervalue vaccines and that both parents and physicians often do not recall the scourges once caused by now vaccine-preventable diseases” (Bumpers et al. 2004, 17). Therefore, without reminders of the importance of vaccinations and reminders of what diseases could break out if there is not wide immunization coverage, parents and physicians could essentially forget what life could be like without widespread coverage of immunization.

Another misperception is that vaccinations are harmful (Bumpers et al. 2004, 17). Misinformation about the safety of vaccines can cause objection to vaccines. Some parents want the right to decide whether or not their children will receive certain vaccines because they are cautious about the effects.<sup>8</sup> “A poll of pediatricians and family

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<sup>8</sup> Parents Requesting Open Vaccination Education (PROVE) is an advocacy group in Texas that promotes a parent’s right to chose whether or not their child should be immunized. PROVE provides information to parents about the dangers of vaccinations and the possible side effects from immunizations. PROVE also lobbies the Texas government to pass bills such as the conscientious objector bill which allows parents to object to immunizations for their children and therefore exempts the child from the vaccination requirements for school attendance.



physicians found that three out of four have encountered a parent that refused child vaccination during the previous year” (Bumpers et al. 2004, 17).

The first criteria used to assess the community demand of a state is whether or not there is a *functional immunization registry* in place in the state. An immunization registry is a way to track state-wide immunization schedules for each child in an area and therefore a parent and/or physician is not solely responsible for keeping track of a child’s immunization schedule. An immunization registry can also be used in a natural disaster when a child has to be moved across state lines and enrolled in a new school system. In this situation, the child’s immunization records would have to be checked in order for the child to enroll in a new school. This situation happened in 2005 with Hurricane Katrina evacuees who were moved from Louisiana to Texas. It was difficult for medical providers to find immunization records on all the children from Louisiana and to know what immunizations a child needed in order to attend Texas schools. A functional immunization registry would have been useful in this situation. As a way of preventing over-immunization, medical providers could have checked Louisiana’s registry for shot records.

There are ways to assess immunization registries in order to know whether they are operating at a level that helps to increase immunization coverage levels. There is a twenty-item list of ideal components for registries from the All Kids Count group. The CDC National Immunization Program (NIP) also developed a twelve-item list of attributes for a successful immunization registry (IOM 2000, 117). For the purpose of this study, the CDC National Immunization Program’s twelve-item list will be used. The NIP list will be used because of the wide support for the list. The list was approved by the

National Immunization Program's Technical Working Group and was approved by the Institute of Medicine. The All Kids Count Initiative, funded by the Robert Wood Johnson Foundation, also collaborated with the Centers for Disease Control and state program managers to create the twelve-item list of minimum functional standards for an immunization registry system.<sup>9</sup>

The first component of a functional immunization registry is *to electronically store all data on NVAC-approved core data elements*. These core elements consist of information of a patient's name, birth date, sex, mother's name, among others (CDC, 2001). The data elements must exist so that immunization registries across the nation can communicate with each other and share a patient's information in the case that a patient moves to a new state. A good example of the importance of this component is the recent movement of many children from Louisiana to Texas because of Hurricane Katrina. An immunization registry from Louisiana that could coincide with information in an immunization registry from Texas would serve helpful for doctors who see the patients and need their immunization histories.

The second component is to *establish a registry record within 6 weeks of birth for each newborn child born in the catchment area*. This requires the registry staff to enter new child information within six weeks of birth.

The third standard is to *enable access to and retrieval of immunization information in the registry at the time of encounter*. This means that the provider and his

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<sup>9</sup> The Centers for Disease Control (CDC) notes that the standards should only apply to those states that have explicit consent, where all children are automatically entered into the registry without parent consent. Texas has an "opt in" registry where parents of children have to sign a form to place their children in the registry, and therefore, Texas is not considered explicit consent state. However, for the purpose of this study, to research the weaknesses of a state's immunization infrastructure and to make recommendations for improvement, the CDC's 12-item list will be used regardless of the explicit consent requirement. The CDC's list will be used in an attempt to uncover the weaknesses of Texas's immunization infrastructure which may include the lack of explicit consent.

or her staff should be able to retrieve the immunization information of a patient when the patient is present. In order for the retrieval of immunization information to be possible at the time of encounter, the immunization registry must provide a means for providers and their staffs to retrieve information. In other words, the registry must be user friendly and available in a provider's office (CDC, 2001).

The fourth standard that the CDC recommends is for the registry to be able to *receive and process immunization information within one month of vaccine administration*. This means that a registry should be able to answer any inquiries on a child's immunization record within one month of the last vaccine administration (CDC, 2001).

The fifth component is for the registry to *protect the confidentiality of health care information*. The registry should have protection and confidentiality procedures in place. This is essential for staff and registry administration to be able to ensure the confidentiality of health care information for patients. The policies and procedures should be consistent with any state privacy laws and also with federal laws including HIPAA (CDC, 2001).

The sixth component is similar to the fifth in that it is to *ensure the security of health care information*. The registry should also have security policies and procedures in place in order to ensure that the health care information of the individuals in the immunization registry is secure (CDC, 2001).

The seventh component requires an immunization registry to be compliant with a certain protocol. This protocol is referred to as the Health Level Seven Standard that makes the exchange of information more user-friendly, standardizing certain messages

available in the registry. The immunization registry should be able to *exchange immunization records using Health Level Seven (HL7) standards* (CDC, 2001).

The eighth component has to do with the immunization registry's function when a child is present to receive a vaccination. According to the CDC, an immunization registry is functional if it can *automatically determine the routine childhood immunization(s) needed, in compliance with current ACIP recommendations, when an individual presents for a scheduled immunization*. The ACIP recommendations are the set of immunizations that a child should receive and when. Therefore, a registry should not only provide a record of past immunizations, but should also be able to give the medical provider information about what vaccinations the child that is present needs according to the ACIP standards (CDC, 2001).

The ninth component is for an immunization registry to *automatically identify individuals due/late for immunization(s) to enable the production of reminder/recall notifications* (CDC, 2001). "Reminders and recalls allow clients to know when vaccinations are due or overdue, as well as when to contact their vaccination provider to determine if vaccinations are needed" (Briss et al. 2000, 100). Reminders for parents can be telephone calls, mailings, automated phone calls and can be either specific or general (Briss et al. 2000, 100). Studies document a twelve percent median point change in the levels of immunization coverage when a reminder/recall system is in use (Briss et al. 2000, 101). Reminder/recall systems have also been recommended by the Institute of Medicine.

The tenth standard of the CDC is for the registry to have an automatic function to *produce immunization coverage reports by providers, age groups, and geographic areas*.

The purpose of this automatic function is so that immunization rates can be assessed by a state health care administration. Then, if needed, the health care administration can attempt to address the situation if immunization coverage is low per provider, age group, and/or geographic area (CDC, 2001).

The eleventh component is for the immunization registry to be able to *produce official immunization records*. The registry should have a function that allows a provider or anyone with proper access to the registry, such as insurance agencies, to produce an official immunization record for a patient (CDC, 2001).

The twelfth and final component is to *promote accuracy and completeness of registry data*. This means that the registry should develop a data quality protocol that is followed in order to produce accurate immunization records for patients (CDC, 2001).

The second criteria to assess community demand is the use of ***multicomponent interventions that include education***. “Multicomponent interventions that include education provide knowledge to target populations and sometimes, to vaccination providers, and use at least one other activity to improve vaccination coverage” (Briss et al. 2000, 102). Educational interventions have not been proven to increase immunization coverage levels if they are used by themselves. Therefore, education interventions must be used with other effective interventions such as reminder/recall systems, expanding health care settings, among others (CDC 2005, 14).

Education interventions have been proven to increase community demand for immunizations. Streatfield, Singarimbun, and Diamond (1990) formed a study to understand why many mothers were not fully immunizing or even partly immunizing

their children<sup>10</sup>. They hypothesized that a higher level in maternal education results in a higher age of child survival, which would mean that the parents used immunization services, among other healthcare services. Streatfield, Singarimbun, and Diamond (1990, 454) found that higher maternal levels of education had a positive correlation with the levels of knowledge about immunization. However, the “effect of formal education on the probability of a child’s being fully immunized disappears when mothers have the correct knowledge of vaccine functions.” The findings of this study imply that there should be efforts made to “present information on the protective function of vaccines – both by health education campaigns and the use of informative names for vaccines” (Streatfield, Singarimbun, and Diamond 1990, 454).

According to the National Immunization Program’s (NIP) Immunization Program Operations Manual (IPOM), there are other components to follow in order for immunization education to have an effect on improving immunization coverage. One of the recommendations is to *collaborate with hospitals, health maintenance organizations, laboratories and/or large group practices in order to promote and provide patient immunization education programs*. If the state pairs with hospitals or large group providers, the partnership enables the education to become area-specific based on the recommendations of the providers or administrations in those areas. The more specific the education materials are, the more likely that it will make a difference with immunization levels in the population (NIP 2003).

The IPOM also recommends that *local television and radio network affiliates facilitate delivery of immunization-related health messages to the community*. The local

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<sup>10</sup> The study was conducted in Indonesia on a sample of married women with children under the age of five.

television and radio messages will also help to spread the message of the importance and safety of immunizations.

In order for the educational messages to improve immunization coverage, the messages should be *relevant according to IPOM standards*. These standards include six components. The education messages should (1) provide information about vaccine-preventable diseases, (2) inform patients that vaccines are safe and effective, (3) provide immunization information for children, (4) give locations of facilities providing immunizations for underserved and under-insured populations, (5) inform consumers about where to get immunization information, and (6) inform parents about their responsibility to maintain an immunization record and bring it to all provider visits (NIP 2003).

The third criterion used to assess community demand in a state is the use of ***vaccination requirements for childcare and school attendance***. The Centers for Disease Control describe school-based immunizations as a “fundamental stimulus” for improving immunization coverage rates (CDC 2005, 15). Vaccination requirements for childcare and school attendance require that a child receive his or her vaccinations before entry into school. The month of August is often a busy time for pediatricians and family physicians as there is a high demand for vaccinations before the beginning of the school year. However, the school requirements for vaccinations vary among states (Briss et al. 2000, 103).

The Task Force on Community Preventive Services found that the states that enforced their immunization requirements by excluding non-immunized children from attendance had a lower incidence of measles. Not only did the childcare and school

attendance vaccine requirements guard children against measles, but also against mumps and rubella. “The three studies that looked at vaccination coverage as an outcome found a median percentage point change of 15 percent” (Briss et al. 2000, 103). In other words, schools with these policies, had a 15% smaller chance of an outbreak of measles, mumps, and/or rubella. Childcare and school vaccination requirements should mandate up-to-date immunization schedules, increase immunization coverage, and therefore help to prevent the outbreak of vaccine-preventable diseases. In order for the vaccination requirements to be up-to-date, the requirements should coincide with the standards of the Advisory Committee on Immunization Practices (ACIP). Along with the ACIP, the schedule is recommended by the Centers for Disease Control, the American Academy of Pediatrics, and the American Academy of Family Physicians. The list is a schedule of recommended vaccinations and their dosages according to age. The ACIP recommendations should be the same as the state-mandated vaccine requirements for childcare and school attendance.

### **Intervention Two**

**Access to Vaccination Services.** In order to provide greater access to vaccination services, states must make the costs of vaccinations affordable as well as ensure that the medical facilities are open at times convenient for parents to utilize. Not all families can afford the cost of vaccinations. Not all parents can take their children to medical facilities for vaccination during daily business hours. These are barriers to wide immunization coverage. Therefore, states need to promote interventions that can overcome these barriers so that every child has access to vaccinations (Briss et al 2000).

*Affordable out-of-pocket costs* help to increase the access to vaccination services by making the vaccination costs more feasible for lower-income families. “The out-of-



pocket costs of vaccination are commonly cited by clients and providers as a barrier to obtaining vaccinations” (Briss et. al. 2000, 108). There are many ways to make out-of-pocket costs affordable for all families.

There are ten components that the IPOM recommends in an effort to make vaccinations affordable to families.

The first recommended component is that vaccinations should be funded *through state revenues*. In order to provide vaccinations for all areas of the community, Medicaid, SCHIP, and also local revenues should be used to supplement federal aid. As funding for vaccinations becomes more available, physicians will be more able to offer less expensive vaccinations to families.

The second recommended component by the IPOM recommends *Medicaid and SCHIP should supplement 317 and VFC grants to cover the cost of all ACIP-recommended vaccines for underserved populations*. State-regulated health plans should not only cover some of the vaccinations that are recommended by ACIP, but each vaccine should also be covered by both state and federal grants, in order to serve the underserved areas<sup>11</sup>.

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<sup>11</sup> This is also a recommendation made by the Texas Medical Association in their 2002 Immunization Policy Paper.

The IPOM also recommends, as the third component, that a state have *legislation or regulations that require insurance coverage for immunization*. Budgets and priorities change with new legislatures, and the IPOM recommends that legislation should be put in place to mandate insurance coverage for immunization.

IPOM recommends that local health departments should be *reimbursed for vaccines and vaccine administration costs*. The health departments can be reimbursed for vaccines and vaccine administration through the state Medicaid agencies. Administration costs may be more expensive than the vaccines themselves, and therefore, both costs should be reimbursed.

The IPOM also recommends two ways to lower out-of-pockets costs that have to do with the amount of vaccines that become expired or wasted. The IPOM recommends that the state *submit an excise tax reimbursement of expired and wasted doses at least every 12 months*. States should also ensure that *no more than 5% of vaccines should become expired or wasted*.

According to the IPOM, the state should also *apportion vaccine purchases appropriately by funding source*. This means that the actual amount of vaccines that are purchased with the state's funding sources should be the same amount that was apportioned to cover the areas that needed vaccine funding.

IPOM suggests that there are two annual plans that should be developed by states in order to plan ahead to make out-of-pocket costs more affordable. The first is an *annual spending plan*. According to the IPOM, the annual spending plan should outline which areas of the state are in most need of vaccinations, the funding sources for the vaccines, and a purchasing schedule to determine when the vaccinations are going to be purchased.

The second report that should be developed by states is a *vaccine accountability plan*.

The vaccine accountability plan outlines the procedures for preventing the expiration and waste of vaccinations and also for preventing fraud. The accountability plan should outline procedures to ensure, for example, that VFC-eligible children are being administered vaccines that are paid for by the federal Vaccines for Children (VFC) grant. The vaccine accountability plan should develop ways to stop vaccine fraud in the state. It is important that the VFC-eligible children actually receive the VFC vaccines.

The final component to make out-of-pocket costs affordable is for the state to give *financial support for WIC screening and referral areas*. According to the IPOM, Women, Infants, and Children (WIC) enrollees tend to be significantly under-immunized.

Therefore, if free vaccine administration can be linked to the WIC program's services, than this can help to increase immunization coverage in under-immunized areas<sup>12</sup>.

The second criterion used to assess access to vaccination services is the use of ***multicomponent interventions that include expanding access in healthcare settings***. Expanding the access in healthcare settings provides more opportunities for parents to take their children to be immunized. "Surveys of client attitudes and behaviors have identified inconvenience of obtaining vaccinations as a major barrier toward improving vaccination rates in children" (Briss et al. 2000, 109). This may also be a larger problem for lower-income families who have large families and are without the means to pay for childcare and transportation (Briss et al. 2000, 109).

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<sup>12</sup> O'Connor (1999) researched the effect of linking food voucher distribution in WIC facilities with up-to-date vaccination records. The WIC sites in Chicago made it mandatory for a family coming in for recertification of food vouchers to also bring their child's immunization records. Some sites also had nurses that were on-site to give the needed vaccinations. The WIC food voucher program motivated families to act constructively with their child's immunization schedule. Any negative incentive programs that withheld food vouchers from families did not give the same incentive.

The Task Force on Community Preventive Services suggests four different ways for *clinics to provide additional services outside routine clinic hours*. The first is to reduce the distance from the medical setting to the population. The second is to increase or change the hours when the vaccination services are open. The third is to deliver vaccination services in clinical settings where they may not have been previously provided (including emergency rooms, inpatient units or other clinics). The last recommendation of the Task Force on Community Preventive Services is to reduce the administrative barriers to vaccinations. This would entail having an “express lane,” and/or drop-in services to expedite the vaccination process and make it easier for parents to bring their children in for vaccinations.

Increasing access in healthcare settings is only proven effective if other interventions are also used.

“Two studies that evaluated expanded access only found median percentage point changes of three percent and seven percent; only one of these reached a level of statistical significance. Studies that evaluated expanding access in combination with other interventions found a median percentage point change of 13 percent” (Briss et al. 2000, 109).

Other interventions that can be used alongside increasing access in medical settings may include provider education, reminder/recall systems, clinic-based and community-wide education, reducing out-of-pocket costs, home visiting, provider assessment and feedback, among others (Briss et al. 2000, 109).

***Vaccination interventions in nonmedical settings*** also help to increase access to immunizations. “Vaccination interventions in nonmedical settings involve efforts to encourage vaccination of important target populations in places where they congregate” (Briss et al. 2000, 110). Even though organizations like the Texas Medical Association recommend that a child have a medical home (a doctor that the child usually sees), this

goal is not always feasible. Cost and accessibility may not make it possible for a child to have a physician that he or she sees at every visit. Therefore, physicians should “recognize that immunizations may, at times, be delivered outside the medical home” (CDC 2005, 18). Vaccinations in nonmedical settings can occur at Special Supplemental Nutrition Programs for Woman, Infants and Children offices, home visits, or in schools and childcare centers. There are four crucial recommendations made by the NIP’s IPOM that will provide effective nonmedical setting immunization interventions.

The first recommendation is to *support school clinics*. This would entail providing immunization services in schools for those children that are not current on their immunizations at entry of school. A child may not have a medical home, and this would be a way for the child to receive the vaccinations that are required for school entry (NIP 2003). As mentioned earlier in the literature review, school attendance/admittance vaccination requirements play an important role in immunization coverage. Therefore, schools and childcare facilities should also be settings where parents and children can receive information and education about their immunizations (CDC 2005). School- and childcare-based interventions can include education for parents, teachers, and children. Schools and childcare centers can also refer under-immunized children to healthcare facilities for vaccinations.

State vaccination services should also be linked *with other public health and social service agencies (WIC, Medicaid, SCHIP) to provide immunization services*. The more access that a child has to vaccinations, the more likely that he or she will be immunized. These public health areas serve the populations that are proven to be under-immunized (NIP 2003). Therefore, linking public health agencies with immunization

services reaches those that are in need of immunizations and also creates an accessible way for children to be administered vaccinations. For example, if a family receives food stamps from the WIC centers, it will be convenient for the child to receive vaccinations at the same time and location. The IPOM refers to this type of service as “one-stop shopping” (NIP 2003).

The last two recommendations have to do with partnering with outreach organizations in order to serve those populations that are considered hard-to-reach. The IPOM recommends that a health organization should *collaborate with community-based organizations (churches, schools, child care facilities) to identify, refer, and follow-up on vaccinations*. These community based organizations will be able to assist with identifying those individuals who need vaccinations.

IPOM also recommends *outreach efforts between public clinics and community organizations*. Through the partnership with public clinics, vaccination services will be brought to the areas that are identified as hard-to-reach. Hard-to-reach individuals are individuals that do not respond to reminders.

### **Intervention Three**

**Provider-Based Interventions.** The provider-based interventions are intended to decrease the amount of missed opportunities for vaccinations. Preventing a missed opportunity means that every time a child comes in to see the physician, whether it is for a well-child check-up or because of illness, the physician knows whether or not the child is due for a vaccination. These provider-based interventions are primarily held in health care settings (IOM 2000).

There is a large number of recommended vaccines; it is important for pediatricians to not miss any opportunities to vaccinate<sup>13</sup>. Even though there is a large amount of vaccines due at each visit, whether or not a child has a deferral of vaccinations is a determining factor of his or her immunization coverage. “The avoidance of a deferred dose visit was the strongest predictor of immunization coverage at age one year” (Meyerhoff and Jacobs 2005, 542). Therefore, there should be provider-based interventions to educate physicians about missed opportunities and the possible results of deferred doses.

*A Provider Reminder/Recall* is an effective Provider-Based intervention. “Provider reminder/recall interventions inform those who administer vaccinations that individual clients are due (reminder) or overdue (recall) for specific vaccinations” (Briss et al. 2000, 114). The provider reminder/recalls can be a reminder in a patient’s chart, a checklist, flowchart, or a computerized reminder that is available for the physician when the client comes to the office (Briss et al. 2000). There has been research to identify that there is an administrative burden associated with the provider reminder/recall system and that physicians rarely use this form of reminder. “A 1992 study indicated that fewer than 20 percent of providers operated any kind of credible reminder-recall system” (IOM 2000, 134). A study in 1999 (Darden, et al. 1999) indicated the same results. This leads to the conclusion that there was little or no improvement in the use of provider reminder/recalls in the seven-year period of 1992 and 1999. Despite the administrative burden, there is strong evidence to suggest that provider reminder/recall systems help to improve immunization rates and assist physicians with missed opportunities to vaccinate.

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<sup>13</sup> Seven injections have been added since 1999 for children under two years and at least five of those are recommended between the ages of two and eight months (Meyerhoff and Jacobs 2005).

Therefore, states should encourage provider reminder/recall systems. One effective way to do that would be for the state immunization registry to have a provider reminder/recall function.

The second provider-based intervention that shows significant evidence for improving immunization coverage rates is *provider assessment and feedback for vaccination providers*. Provider assessment and feedback is important because physicians can overestimate the immunization coverage rates of their patients, thinking that more patients are up-to-date on their immunizations than in actuality (IOM 2000). “In a California study, for example, physicians estimated that about 90 percent of their patients were up-to-date, although record audits indicated that the actual rate was well below 70 percent” (IOM 2000, 134). The overestimation of immunization coverage rates can be a big problem in that physicians are missing opportunities to administer vaccinations because they already believe that their patients have received the recommended vaccinations to date. Therefore, assessment and feedback of providers can be a useful tool to ensure that providers have the correct information on the immunization rates of their patients.

Assessment and feedback interventions involve evaluating providers in delivering “one or more vaccinations to a client population” (IOM 2000, 135). The information that is obtained by the assessment evaluation can be given to the provider for self-evaluation, for providers to compare with their peers, or to be compared against a standard or goal (IOM 2000).

The use of the assessment and feedback intervention not only alerts the provider about the actual coverage rates of his patients, but also has the capability of changing the



way a provider runs his office when dealing with immunizations (IOM 2000). The provider may see that the assessment and feedback has alerted him to the real immunization levels of his clients and may want to implement a reminder/recall system in everyday practice (IOM 2000). Again, there are administrative burdens associated with the provider assessment and feedback intervention, but because the research suggests that it can assist with high immunization coverage levels, its use should be encouraged among states and medical providers. The most commonly used assessment and feedback tool was developed by the CDC and is referred to as the Assessment, Feedback, Incentive, and eXchange (AFIX).

### **Summary**

Table I, on page 35, summarizes the interventions that have been described above. The interventions that are described are not intended to be the absolute best practices for high immunization coverage levels in states, but are to be guidelines to assist states in assessing their own immunization interventions and in improving their immunization coverage levels (Ruiz 2004). “The framework represents a starting point and is itself subject to revision” (Shields and Tajalli 2005, 26). The practical ideal type of immunization interventions should help states to direct their efforts when attempting to improve their immunization coverage levels. Implementation of these interventions mentioned, if used appropriately, will assist states in improving their childhood immunization levels.

**Table I. Conceptual Framework**

<b>CONCEPTUAL FRAMEWORK</b>	<b>SOURCE</b>
<b>Intervention 1: Community Demand for Vaccinations</b>	
<b>1.1 Functional Immunization Registry</b>	
1.1.1 Electronically store data on all NVAC - approved core data elements	
1.1.2 Establish a registry record within 6 weeks of birth for each newborn child born in the catchment area	
1.1.3 Enable access to and retrieval of immunization information in the registry at the time of encounter	
1.1.4 Receive and process immunization information within 1 month of vaccine administration	
1.1.5 Protect the confidentiality of health care information	
1.1.6 Ensure the security of health care information	
1.1.7 Exchange immunization records using Health Level Seven (HL7) Standards	
1.1.8 Automatically determine the routine childhood immunization(s) needed, in compliance with current ACIP recommendations, when an individual presents for a scheduled immunization	
1.1.9 Automatically identify individuals due/late for immunization(s) to enable the production of reminder/recall notifications	
1.1.10 Automatically produce immunization coverage reports by providers, age groups, and geographic areas	
1.1.11 Produce official immunization records	
1.1.12 Promote accuracy and completeness of registry data	
<b>1.2 Multicomponent interventions that include education.</b>	
1.2.1 Must use with at least one of the following activities to improve vaccination coverage: client reminders, provider education, expanded hours or access in clinical settings, provider reminders, reduce out-of-pocket costs, client-held vaccination records, WIC interventions, nutrition services, or home visits.	
1.2.2 Work with hospitals, health maintenance organizations, laboratories and/or large group practices to involve in partnerships to promote and provide patient immunization education programs.	
1.2.3 Local television and radio network affiliates facilitate delivery of immunization-related health messages to community.	
1.2.4 Messages to consumers are relevant according to IPOM standards	
<b>1.3 Vaccination requirements for childcare and school attendance</b>	
1.3.1. Vaccination requirements that coincide with ACIP standards	

Briss, et al 2000, Bumpers et. al. 2004, CDC 2001, CDC 2005, CDC 2006, Fairbrother, et al 2000, IOM 2000, NIP 2003, Streatfield; Singarimbun; & Diamond 1990, TDH 2003, TMA 2002 ,

Intervention 2: Access to Vaccination Services	
<b>2.1 Affordable out-of pocket costs.</b>	
2.1.1 Funding for vaccine from state revenues	Briss, et al. 2000, Bumpers et al. 2004, CDC 2005, IOM 2000, IOM 2003, NIP 2003 O'Connor 1999,
2.1.2 Medicaid and SCHIP supplement 317 and VFC grants to cover the cost of all ACIP-recommended vaccines for underserved populations	
2.1.3 Legislation or regulations that require insurance coverage for immunization	
2.1.4 Local health departments are reimbursed for vaccines and vaccine administration costs	
2.1.5 Submit a request for excise tax reimbursement of expired and wasted doses at least every 12 months.	
2.1.6 No more than 5 % of vaccines should become expired or wasted	
2.1.7 Apportion vaccine purchases appropriately by funding source.	
2.1.8 Annual vaccine spending plan	
2.1.9 Vaccine accountability plan	
2.1.10 Financial support for WIC screening and referral areas	
<b>2.2 Muticomponent interventions that include expanding access in health care setting.</b>	
2.2.1. Must use with at least one of the following activities to improve vaccination coverage: client reminders, provider education, provider reminders, reduce out-of-pocket costs, client-held vaccination records, WIC interventions, nutrition services, or home visits.	
2.2.2 Clinics provide additional services outside routine clinic hours	
<b>2.3 Vaccination interventions in nonmedical settings</b>	
2.3.1 "Back to school" clinics	
2.3.2 Link services with other public health and social service agencies (WIC, Medicaid, SCHIP) to provide immunization services as well.	
2.3.3 Collaborate with community-based organizations (churches, schools, child care facilities) to identify, refer, and follow-up on vaccinations	
2.3.4 Outreach efforts between public clinics and community organizations	

Intervention 3: Provider-Based Interventions	
3.1 Functional Provider Reminder/Recall	Briss et al. 2000, CDC 2004, CDC 2005(a), CDC 2005 (b),
3.2 Assessment and Feedback for Vaccination Providers	Darden et al. 1999, Fairbrother et al. 2000, IOM 2000, NIP 2003, TDH 2003, TMA 2002,

## **Chapter IV – Methodology**

The purpose of this chapter is to describe the methodology used to answer the research purpose of this Applied Research Project. Three types of data collection were used: document analysis, content analysis, and an interview.

First, document analysis was conducted to examine Texas' current laws, policies, and regulations pertaining to immunizations in the state. Second, content analysis was used to review the websites of public agencies and departments in the state of Texas. Third, an interview was conducted where document and content analysis were not applicable. The interview helped to compare aspects of Texas' immunization infrastructure to the components of the practical ideal type. The following pages contain the operationalization tables that explain the data collection and analysis methods that were used for each component of the practical ideal type.

**Table 4.1: Operationalization: Linking document and content analysis to the conceptual framework – Intervention One: Community Demand for Vaccinations**

Criteria	Source
<b>1.1. Immunization Registry</b>	
1.1.1 Electronically store data on all NVAC - approved core data elements	House Bill 1921 of the 78th Texas Legislature, Occupations Code 159.002, House Bill 2292 of the 78th Texas Legislature, Health and Safety Code 161.007
1.1.2 Establish a registry record within 6 weeks of birth for each newborn child born in the catchment area.	House Bill 1921 of the 78th Texas Legislature, Occupations Code 159.002, House Bill 2292 of the 78th Texas Legislature, Health and Safety Code 161.007
1.1.3 Enable access to and retrieval of immunization information in the registry at the time of encounter.	House Bill 1921 of the 78th Texas Legislature, Occupations Code 159.002, House Bill 2292 of the 78th Texas Legislature, Health and Safety Code 161.007
1.1.4 Receive and process immunization information within 1 month of vaccine administration	House Bill 1921 of the 78th Texas Legislature, Occupations Code 159.002, House Bill 2292 of the 78th Texas Legislature, Health and Safety Code 161.007
1.1.5 Protect the confidentiality of health care information.	House Bill 1921 of the 78th Texas Legislature, Occupations Code 159.002, House Bill 2292 of the 78th Texas Legislature, Health and Safety Code 161.007
1.1.6 Ensure the security of health care information	House Bill 1921 of the 78th Texas Legislature, Occupations Code 159.002, House Bill 2292 of the 78th Texas Legislature, Health and Safety Code 161.007
1.1.7 Exchange the immunization records using Health Level Seven (HL7) standards	House Bill 1921 of the 78th Texas Legislature, Occupations Code 159.002, House Bill 2292 of the 78th Texas Legislature, Health and Safety Code 161.007
1.1.8 Automatically determine the routine childhood immunization(s) needed, in compliance with current ACIP recommendations, when an individual presents for a scheduled immunization.	House Bill 1921 of the 78th Texas Legislature, Occupations Code 159.002, House Bill 2292 of the 78th Texas Legislature, Health and Safety Code 161.007

**Table 4.1 continued**

<b>Criteria</b>	<b>Source</b>
1.1.9 Automatically identify individuals due/late for immunization(s) to enable the production of reminder/recall notifications.	House Bill 1921 of the 78th Texas Legislature, Occupations Code 159.002, House Bill 2292 of the 78th Texas Legislature, Health and Safety Code 161.007
1.1.10 Automatically produce immunization coverage reports by providers, age groups, and geographic areas.	House Bill 1921 of the 78th Texas Legislature, Occupations Code 159.002, House Bill 2292 of the 78th Texas Legislature, Health and Safety Code 161.007
1.1.11 Produce official immunization records	House Bill 1921 of the 78th Texas Legislature, Occupations Code 159.002, House Bill 2292 of the 78th Texas Legislature, Health and Safety Code 161.007
1.1.12 Promote accuracy and completeness of registry data.	House Bill 1921 of the 78th Texas Legislature, Occupations Code 159.002, House Bill 2292 of the 78th Texas Legislature, Health and Safety Code 161.007
<b>1.2 Multicomponent interventions that include education.</b>	
1.2.1 Must use with at least one of the following activities to improve vaccination coverage: client reminders, provider education, expanded hours or access in clinical settings, provider reminders, reduce out-of-pocket costs, client-held vaccination records, WIC interventions, nutrition services, or home visits.	Texas ImmTrac system
1.2.2 Work with hospitals, health maintenance organizations, laboratories and/or large group practices to involve in partnerships to promote and provide patient immunization education programs.	Senate Bill 316 of the 79th Texas Legislature and documents required by SB 316, Senate Bill 40 of the 78th Texas Legislature, Annual Report on Plans to Increase Immunization rates
1.2.3 Local television and radio network affiliates facilitate delivery of immunization-related health messages to community.	Senate Bill 316 of the 79th Texas Legislature and documents required by SB 316, Senate Bill 40 of the 78th Texas Legislature, Annual Report on Plans to Increase Immunization rates
1.2.4 Messages to consumers are relevant according to Immunization Program Operations Manual standards.	materials mandated by SB 316 of the 79th Texas Legislature, The Texas Department of State Health Services "Public Information" homepage, New radio and television advertisements from DSHS website

**Table 4.1 continued**

Criteria	Source
<b>1.3 Vaccination requirements for childcare and school attendance</b>	
1.3.1 Vaccination requirements that coincide with ACIP standards.	Title 25 Health Services, 97.61-97.72 of the Texas Administrative Code

**Table 4.2: Operationalization: Linking document analysis and content analysis to the conceptual framework– Intervention Two: Access to Vaccination Services**

Criteria	Source
<b>2.1 Affordable out-of-pocket costs</b>	
2.1.1 Funding for vaccines from state and local revenues.	Department of State Health Services FY 2006 budget
2.1.2 Medicaid and SCHIP supplement 317 and VFC grants to cover the cost of all ACIP-recommended vaccines for underserved populations	Department of State Health Services FY 2006 budget
2.1.3 Legislation or regulations that require insurance coverage for immunization.	state of Texas legislation
2.1.4 Local health departments are reimbursed for vaccines and vaccine administration costs.	2004 Annual Report on Plans to Increase Immunization Rates in Texas
2.1.5 Submit a request for excise tax reimbursement of expired and wasted doses at least every 12 months.	Texas Department of State Health Services Vaccine Management Webpage
2.1.6 No more than 5% of vaccines should become expired or wasted.	Texas Department of State Health Services Vaccine Management Webpage
2.1.7 Apportion vaccine purchases appropriately by funding source.	Texas Department of State Health Services Vaccine Management Webpage
2.1.8 Annual vaccine spending plan.	Texas Department of State Health Services Vaccine Management Webpage
2.1.9 Vaccine accountability plan.	Texas Department of State Health Services Vaccine Management Webpage
2.1.10 Financial support for WIC screening and referral areas.	Texas Administrative Code, Title 25, chapter 31.24



**Table 4.2 continued**

Criteria	Source
<b>2.2 Multicomponent interventions that include expanding access in healthcare setting.</b>	
2.2.1 Must use with at least one of the following activities to improve vaccination coverage: client reminders, provider education, expanded hours or access in clinical settings, provider reminders, reduce out-of-pocket costs, client-held vaccination records, WIC interventions, nutrition services, or home visits.	Texas ImmTrac system
2.2.2 Clinics provide additional services outside routine clinic hours	Annual Report on Plans to Increase Immunization Rates in Texas, Migrant Health Promotion website, and The Texas Women, Infants, and Children (WIC) website
<b>2.3 Vaccination interventions in nonmedical settings.</b>	
2.3.1 Support school clinics	2004 Annual Report on School-Based Health Centers
2.3.2 Link services with other public health and social service agencies (WIC, Medicaid, SCHIP) to provide immunization services as well.	Texas Administrative Code, Title 25, Chapter 31.24
2.3.3 Collaborate with community-based organizations (churches, schools, child care facilities) to identify, refer, and follow-up on vaccinations.	Annual Report on Plans to Increase Immunization Rates in Texas, Texas Immunization Coalition web pages
2.3.4 Outreach efforts between public clinics and community organizations.	Senate Bill 486 of the 78 <sup>th</sup> Texas Legislature

**Table 4.3 Operationalization: Linking interview questions with the conceptual framework – Intervention Two: Access to Vaccination Services**

<b>Component</b>	<b>Interview question</b>
2.1.5 Submit a request for excise tax reimbursement of expired and wasted doses at least every twelve months.	1. Does the Department of State Health Services submit a request for excise tax reimbursement of expired and wasted doses at least every twelve months?
2.1.6 No more than 5% of vaccines should be expired or wasted	2. Is the annual percentage of wasted vaccines less than 5%?
2.1.8 Annual vaccine spending plan	3. Does the state of Texas have an annual vaccine spending plan?
2.1.9 Vaccine accountability plan.	4. Does the state of Texas have a vaccine accountability plan?

**Table 4.4 Operationalization: Linking document and content analysis with the conceptual framework – Intervention Three: Provider-Based Interventions**

<b>Criteria</b>	<b>Source</b>
<b>3.1 Provider Reminder/Recall present in registry</b>	HB 1921
<b>3.2. Assessment and Feedback for Vaccination Providers</b>	Texas' AFIX program

## **Research Technique and Methodology**

The unit of analysis in this study is the state of Texas' immunization infrastructure as it exists in 2006. Three data collection methods were used: document analysis, content analysis, and an interview.

(1) *Document analysis* was used because it provides information over a long time span (Yin 2003, 86). Texas' immunization infrastructure is currently a work in progress, but has been in place for many years. Document analysis is a tool used when research covers many events over many years. Another strength of document analysis is that it was the best research method to use given the time constraints of an Applied Research Project.

Weaknesses associated with document analysis are: low retrievability, reporting bias, and access (Yin 2003, 86). Retrievability and access were addressed through content analysis and an interview. If there were no documents available for the practical ideal type components, then an interview was conducted. Reporting bias was closely monitored throughout the document analysis research. The documents that were used in the document analysis are listed below:

- House Bill 1921
- Occupations Code 159.002
- Senate Bill 316
- Documents required by Senate Bill 316
- Annual Report on Plans to Increase Immunization Rates in Texas
- Scripts from recent immunization radio and television advertisements conducted by the Department for State Health Services

- Advisory Committee on Immunization Practices immunization requirements
- Minimum State Vaccine Requirements for Texas School Entrance/Attendance
- Department of State Health Services Fiscal Year 2006 budget
- Texas Administrative Code, Title 25, Chapter 31.24
- Senate Bill 486
- Texas' Assessment, Feedback, Incentives and Exchange (AFIX) program policies

(2) *Content analysis* was used to assess websites of departments, agencies, and programs that are fully or partially funded through the state. According to Babbie (2001), content analysis is an effective method of data analysis because it is an unobtrusive measure. The materials on the website were already written and therefore were not changed or adjusted as a result of the research.

A disadvantage to content analysis is similar to that in document analysis; the research is limited to recorded information (Babbie 2001, 324). The problem of limited information on websites was taken into account and an interview was used if the webpage did not provide enough information for a certain component of the practical ideal type. The websites that were used are listed below.

- Texas ImmTrac website ([www.dshs.state.tx.us/immunize/immtrac](http://www.dshs.state.tx.us/immunize/immtrac) )
- The Texas Department of State Health Services “Public Information – for Parents and Consumers” homepage ([www.dshs.state.tx.us/immunize/public.shtm](http://www.dshs.state.tx.us/immunize/public.shtm) )
- The Texas Department of State Health Services Vaccine Management webpage ([www.dshs.state.tx.us/immunize/vac\\_manage.shtm](http://www.dshs.state.tx.us/immunize/vac_manage.shtm) )
- Migrant Health Promotion webpage ([www.migranthealth.org](http://www.migranthealth.org) )

- The Texas Women, Infants, and Children (WIC) webpage  
([www.dshs.state.tx.us/wichd](http://www.dshs.state.tx.us/wichd) )
- The Texas Immunizations Coalitions webpage  
([www.dshs.state.tx.us/immunize/partners/coalitions.shtm](http://www.dshs.state.tx.us/immunize/partners/coalitions.shtm) )

(3) *An Interview* was used in conjunction with the content and document analysis.

An interview was conducted when there was no recorded information available for a particular component of the practical ideal type. The strength of the interview was that it was targeted and focused directly on the practical ideal type component being studied (Yin 2003, 86).

The document and content analyses account for the weaknesses of the interviews, which are response bias, inaccuracies due to recall, or the interviewee answering with what the researcher wants to hear (Yin 2003).

One member of the Texas Department of State Health Services' Immunization Branch was interviewed. Interview questions were based on the components of the practical ideal type.

### **Protocols**

The first step that I took when starting the operationalization phase was to speak with professionals in the childhood immunization field. I met with employees of Texas Medical Association, Texas Pediatric Society, and the Texas Department of State Health Services, and they referred me to relevant documents. I then used the documents that they referred as sources for document analysis. Some of the documents that I was referred to also led me to other relevant Texas legislation. After I gathered all the relevant

documents for the document analysis and found gaps in my operationalization tables, I looked at websites of public health agencies that dealt with childhood immunization policies. The websites were used for content analysis.

Each document and content analysis was done with a coding sheet. Variables were assigned where one equals Exists and zero equals Does not exist.

The interview was done by contacting an employee from the Texas Department of State Health Services Immunization Branch. The employee was asked questions relevant to the practical ideal type components and the responses were also coded using variables, where one equals yes and zero equals no.

### **Human Subjects Protection**

The only foreseeable discomfort to the interviewee was that the interviewee might feel uncomfortable revealing information about the department. The interviewee could have a confidentiality agreement with their department that the interviewee did not want to break. The interviewee was told before the interview that they did not have to answer any questions that could make them uncomfortable. The interview was completely voluntary and the participant had the right to discontinue the interview at any time. The Texas State Institutional Review Board approved the interview questions and the case number is 05-0433.



## **Chapter V – Results**

The purpose of this chapter is to present and analyze the results of Texas' immunization infrastructure compared to the practical ideal type on page 35. The practical ideal type was formed using the literature review and guided the data collection outlined in chapter IV.

The results from this data collection show that Texas is adhering to the components of the practical ideal type at different levels. The provider-based interventions are present in Texas' immunization infrastructure, and Texas complies with the other two interventions (community demand and access to vaccinations) at different degrees.

### **Limitations of the study**

Because of time constraints, this Applied Research Project offers only a broad look at Texas's immunization infrastructure. Each immunization intervention was studied in terms of whether or not it is present in the infrastructure. Future research could select any of the three broad immunization interventions and research in detail how well they are functioning in Texas. A study of functionality might create a better understanding of why Texas's immunization coverage is lower than the national average.

### **Intervention One – Community Demand for Vaccinations**

A **functional immunization registry** is a way to track immunization records for each child in a geographic area. When a successful immunization registry is present, the physician or parent is no longer solely responsible for a child's immunization records.



The immunization records are easily accessible in the registry and an authorized individual can access the records at any time.

The Centers for Disease Control (CDC) National Immunization Program (NIP) developed a twelve-item list of attributes for a successful immunization registry (IOM 2000, 117). Document analysis shows that nine components of the twelve are found in Texas's immunization registry, ImmTrac.

**Table 5.1 Document and Content Analysis for Intervention 1.1 – Functional Immunization Registry**

<b>Component</b>	<b>HB 1921</b>	<b>Occupations Code 159.002</b>	<b>ImmTrac website</b>
1.1.1 Electronically store all NVAC*-approved core data elements	Does not exist	Does not exist	Does not exist
1.1.2 Establish a registry record within 6 weeks of birth for each newborn child in the catchment area.	Does not exist	Does not exist	Does not exist
1.1.3 Enable access to and retrieval of immunization information in the registry at the time of encounter.	Does not exist	Does not exist	Exists
1.1.4 Receive and process immunization information within 1 month of vaccine administration.	Exists	Does not exist	Exists
1.1.5 Protect the confidentiality of health care information.	Exists	Exists	Exists
1.1.6 Ensure the security of health care information.	Does not exist	Does not exist	Exists
1.1.7 Exchange immunization records using Health Level Seven (HL7) standards	Does not exist	Does not exist	Does not exist
1.1.8 Automatically determine the routine childhood immunization(s) needed, in compliance with current ACIP recommendations, when an individual presents for a scheduled immunization.	Does not exist	Does not exist	Exists
1.1.9 Automatically identify individuals due/late for immunization(s) to enable the production of reminder/recall notifications.	Exists	Does not exist	Exists
1.1.10 Automatically produce immunization coverage reports by providers, age groups, and geographic areas.	Does not exist	Does not exist	Exists
1.1.11 Produce official immunization records.	Does not exist	Does not exist	Exists
1.1.12 Promote accuracy and completeness of registry data.	Exists	Does not exist	Exists

\* National Vaccine Advisory Committee

### *House Bill 1921*

House Bill (HB) 1921 was passed in 2003 by the 78<sup>th</sup> Texas Legislature and is a bill that relates to the functionality of ImmTrac, the Texas immunization registry. House Bill 1921 mandates four of the twelve functional immunization registry components found in Intervention 1.1 of the practical ideal type. Explanations for why eight components do not appear in House Bill 1921 are described below.

HB 1921 identifies the data elements (patient's name, date the vaccine is administered, vaccine manufacturer, et al.) that are to be included in the Texas immunization registry. However, the data elements mandated by HB 1921 do not meet the elements approved by NVAC. The NVAC recommendations exist so that immunization registries across the country will be uniform. When the registries are uniform, it is easier for information to be transmitted from registry to registry when patients change geographic locations. HB 1921 shows that the Texas immunization registry is lacking four of the data elements that NVAC has advised be included in every immunization registry.

To adhere to component 1.1.2 of establishing a registry record within six weeks of birth, ImmTrac must change from an "opt-in" registry to an "opt-out" registry. As ImmTrac currently operates, a parent or guardian must sign a consent form for the child to be included in the registry. If there is no consent, then the child is not included in the registry. The Texas registry would be more complete if each child was automatically entered into the registry at birth and removed only if the parent or guardian decides to remove the child from the registry.

House Bill 1921 does not mention anything about components 1.1.3 – 1.1.4.

HB 1921 also does not cover information about the security of the health care documents kept in immunization registries. There should be safeguards against foreseeable threats. Security measures such as user IDs and passwords should be mandated by law.

HB 1921 does not mention anything about components 1.1.7, 1.1.8., or 1.1.10 of the practical ideal type.

Section 161.0074, of House Bill 1921 requires a report be given to the legislature no later than Sept 30 of interim years with information that includes geographic regions. However, the Centers for Disease Control (CDC) recommend that reports be available by providers, age groups, and geographic areas. Therefore, the legislation does not adhere to the recommendation of the CDC.

#### *Texas Occupations Code 159.002*

The Texas Occupations Code requires one component out of the twelve-item list provided by CDC's National Immunization Program. Occupations Code 159.002 exists so that the confidentiality of the healthcare information provided in the registry is protected. Therefore, the code adheres only to component 1.1.5 of the practical ideal type.

#### *The Texas ImmTrac Website*

There were five sections of the ImmTrac website that were used to compare the Texas registry to the components of the practical ideal type. The sections of the webpage include the "Impact of HIPPA on Reporting to the Texas Immunization Registry," "Electronic Transfer Standards for Providers", "ImmTrac Quality Assurance Processes,"

“Rules Concerning the Texas Immunization Registry,” and the homepage of the ImmTrac website.

The ImmTrac website provided information on nine of the twelve components that the CDC recommends for a functional immunization registry. The three components that were not included in any of the website materials were components 1.1.1, 1.1.2, and 1.1.7.

Therefore, according to the document and content analysis conducted, the Texas immunization registry does not operate according to the Centers for Disease Control’s immunization registry minimum functional standards.

**Multicomponent Interventions that Include Education.** Education interventions help provide vaccination information to certain populations and to providers. However, education interventions have not been proven effective in increasing immunization rates if they are used alone. Education interventions must be used with other effective interventions such as reminder/recall systems and expanding health-care settings (CDC 2005, 14).

Document analysis from Table 5.1 shows that client reminder/recall is being used in Texas. The use of client reminder/recall is important because education interventions will only be effective if the state uses another effective immunization intervention. Therefore, interventions in Texas that include education will increase immunization rates because they will be used in a state where client reminder/recall is present.

**Table 5.2 Document analysis for Intervention 1.2 – Multicomponent interventions that include education**

<b>Component</b>	<b>Client reminder/recall</b>	<b>Provider education</b>	<b>Expanded hours or access in clinical settings</b>	<b>Provider reminders</b>
1.2.1 Must use at least one of the following activities to improve vaccination services: client reminders, provider education, expanded hours or access in clinical settings, provider reminders, reduce out-of-pocket costs, client-held vaccination records, WIC interventions, nutrition services, or home visits.	Present			

According to the Centers for Disease Control’s Immunization Program Operations Manual (IPOM), education interventions should be conducted using a certain method and conveying certain messages to effectively increase immunization rates. The following document analysis was conducted to compare Texas’ immunization educational interventions to the recommendations of the IPOM.

**Table 5.3 – Document analysis for Intervention 1.2 – Multicomponent interventions that include education**

<b>Component</b>	<b>SB 316</b>	<b>Documents required by SB 316</b>	<b>SB 40</b>	<b>Annual Report on Plans to Increase Immunization Rates</b>
1.2.2 Work with hospitals, health maintenance organizations, laboratories and/or large group practices to involve in partnerships to promote and provide patient immunization education programs.	Present	Present	Present	Present
1.2.3 Local television and radio network affiliates facilitate delivery of immunization-related health messages to community.	Not Present	Not Present	Not Present	Present

*Senate Bill 316*

Senate Bill (SB) 316, passed by the 78<sup>th</sup> Texas Legislature, requires that Texas design and print a pamphlet that contains a list of vaccine-preventable diseases for children. The pamphlet must be used by any Texas person or institution that is involved in the birthing process. The bill requires that the Texas Department of State Health Services update the pamphlet quarterly so that the immunization information is current. Senate Bill 316 satisfies the IPOM’s recommendation to work with hospitals and other healthcare centers to promote and provide immunization education programs (component 1.2.2). However, SB 316 does not require local television and radio network affiliates to facilitate delivery of immunization education (component 1.2.3.).

*Pamphlet required by Senate Bill 316*

The pamphlet mandated by Senate Bill 316 satisfies component 1.2.2 of the practical ideal type. The pamphlet provides immunization information and involves partnerships to promote and provide immunization and education programs.

The pamphlet gives parents immunization resources at the end of the pamphlet. For example, the pamphlet directs new parents to the telephone number for the Texas Immunization Information Line and also gives website information for Immunize Texas.

The SB 316 pamphlet does not satisfy component 1.2.3, for the pamphlet does not mention radio or television affiliates connected with immunization-related information.

*Senate Bill 40*

Senate Bill 40 of the 78<sup>th</sup> Texas Legislature directs the Texas Department of State Health Services to “institute a continuous statewide immunization education campaign and increase coordination between local, regional, and state stakeholders on immunization through a statewide coalition” (SB 40 Bill analysis). Therefore, Senate Bill 40 satisfies the recommendations of the IPOM to involve large group practices to promote and provide patient immunization education programs (component 1.2.2).

Senate Bill 40 does not specifically mandate that local television and network affiliates be included in the immunization education programs. However, television and radio public service announcements may be a result of the statewide coalition mandated by SB 40. For the purpose of this study, because television and radio advertisements were not directly mandated by SB 40, the legislation does not satisfy the IPOM’s recommendation (component 1.2.3).



*The Annual Report on Plans to Increase Immunization Rates (2004)*

The Annual Report on Plans to Increase Immunization Rates is submitted by the Department on State Health Services (DSHS) and meets the reporting requirements of Texas Health and Safety Code and Article II, Rider 35 of the 78<sup>th</sup> Legislature's General Appropriations Act. The Annual Report contains information that satisfies both recommendations of the IPOM for education interventions.

The Annual Report includes information regarding the DSHS initiatives taken to provide educational programs along the Texas/Mexico border, satisfying the partnership agreement. The Texas DSHS provides funding for border county health departments to educate the public about the immunization registry and vaccine administration, among others. The funding also helps assess vaccine coverage levels at the clinic level and conduct vaccine-preventable disease surveillance. Also, in 2004, the DSHS allocated \$100,000 to the University of North Texas to support its education services and partnership with the senior community of volunteers. Seniors in the area form coalitions and volunteer to educate new parents about immunizations. All of the partnerships mentioned above coincide with the recommendations of the IPOM.

The Annual Report includes the Department of State Health Services funding information for targeting media markets. DSHS launched a media campaign in Houston and Dallas that targeted the African-American media market. The DSHS also targeted 11 of 20 general population and Hispanic media markets in 2003.

Not only do the education interventions need to be conducted in certain facilities and with certain partnerships, but also they must convey the right messages. There are six standards that should be met, according to the Immunization Program Operations Manual (IPOM), in order to provide effective immunization education messages. Document analysis shows that among the three Texas immunization educational materials examined in this study, none of them complied with all six recommendations of the IPOM.

**Table 5.4 Document and Content Analysis for Intervention 1.2 – Multicomponent interventions that include education**

<b>1.2.4 Messages to consumers are relevant according to IPOM standards.</b>	<b>Education materials mandated by SB 316</b>	<b>"Public Information - for Parents &amp; Consumers" homepage</b>	<b>Radio and television advertisements</b>
1.2.4.1 Information about VPDs	Not present	Present	Present
1.2.4.2 Vaccines are safe and effective	Not present	Present	Present
1.2.4.3 Immunization recommendations for children	Present	Present	Not Present
1.2.4.4. Location of facilities providing immunizations for underserved and under-insured populations.	Not Present	Present	Not Present
1.2.4.5 Where to get immunization information	Present	Present	Present
1.2.4.6 Responsibility to maintain an immunization record and bring it to all provider visits.	Not Present	Not Present	Not Present

*Pamphlet required by Senate Bill 316*

The educational pamphlet mandated by Senate Bill 316 meets two of the six IPOM recommendations for effective education messages. The pamphlet provides immunization recommendations for children and directs parents to hotlines and websites that provide immunization information (components 1.2.4.3 and 1.2.4.5).

*The Department of State Health Services “Public Information – for Parents and Consumers” webpage*

The public information webpage for the Department of State Health Services complies with five of the six IPOM recommendations.

The informational webpage provides the public with information on locations of facilities providing immunizations. The webpage gives parents information on where to get an influenza vaccination and lists of contacts for local clinics.

The webpage also satisfies the IPOM recommendation to convey that vaccines are safe and effective. The DSHS webpage has a “vaccine safety” section of the public information webpage that says “vaccines are the safest and most effective tool we have to prevent serious and sometimes fatal diseases like pertussis (whooping cough), measles, tetanus, hepatitis B, diphtheria, as well as others.”

The webpage also provides the public with information about vaccine-preventable diseases, immunization recommendations for children, and phone numbers and websites for immunization information. All three satisfy the recommendations made by the IPOM.

The Public Information website does not contain any information about the responsibility to maintain an immunization record.

### *Radio and television advertisements*

The Texas Department of State Health Services has new radio and television advertisements that reinforce the importance of childhood immunization. The 30-second advertisements meet three of the six IPOM immunization education recommendations. The scripts for the radio and television advertisements are identical. The education information provided gives information about Vaccine-Preventable Diseases (VPDs), conveys the message that the vaccines are safe and effective, and gives immunization hot-line and website information (components 1.2.4.1, 1.2.4.2, and 1.2.4.5).

**Vaccination requirements for childcare and school attendance.** The Centers for Disease Control (CDC) describe school-based immunizations as a “fundamental stimulus” for improving immunization rates (CDC 2005, 15). Childcare and school vaccination requirements should mandate up-to-date immunization schedules, increase immunization coverage, and help prevent the outbreak of vaccine-preventable diseases (CDC 2005). Document analysis shows that Texas’ school requirements do not meet the Advisory Committee on Immunization Practices (ACIP) immunization requirements.

**Table 5.5 – Document analysis for Intervention 1.3 –  
Vaccination Requirements for childcare and school attendance**

<b>ACIP recommendation</b>	<b>Texas Requirement</b>
1. 3 doses of Hepatitis B	Present
2. 5 doses of Dtap by age 6	Present
3. 3 doses of Hib	Not Present
4. 2 doses of MMR	Present
5. 1 dose of Varicella	Present
6. 3 doses of IPV	Not Present
7. 4 Doses of PCV	Not Present
8. Yearly Influenza	Not Present
9. HepA Series	Not Present

Texas school requirements include four of the nine ACIP requirements. However, in the case of the IPV vaccination, Texas’ school requirements are stricter than the ACIP requirements. For the purpose of this study, any deviation from the ACIP requirements is recorded as not satisfying the component of the practical ideal type.

**Intervention Two – Access to Vaccination Services**

**Out-of-pocket costs are affordable.** Expensive out-of-pocket costs are often cited by clients as a barrier to immunizations (Briss et al. 2000, 108). The Immunization Program Operations Manual (IPOM) provides components that states can use as a way of lowering out-of-pocket costs. Some of the ten IPOM requirements that are included in the practical ideal type are also grant requirements from the Centers for Disease Control, therefore, Texas has to adhere to the requirements to qualify for federally funded immunization grants. The use of the IPOM requirements not only help reduce out-of-pocket costs because they require a more effective use of vaccinations, but also because

the requirements help the state to qualify for federal grant money. Document analysis shows that Texas meets six out of the ten IPOM requirements.

**Table 5.6 – Document and content analysis for Intervention 2.1 – Out-of-pocket costs are affordable**

<b>Component</b>	<b>Document</b>	<b>Measurement</b>
2.1.1 Funding for vaccines from state revenues	Department of State Health Services FY 06 budget	Present
2.1.2 Medicaid and SCHIP supplement 317 and VFC grants to cover the cost of all ACIP-recommended vaccines for underserved populations.	Department of State Health Services FY 06 budget	Present
2.1.3 Legislation or regulations that require insurance coverage for immunizations.	State of Texas legislation	Not Present
2.1.4 Local health departments are reimbursed for vaccines and vaccine administration costs.	2004 Annual Report on Plans to Increase Immunization Rates in Texas	Present
2.1.5 Submit a request for excise tax reimbursement of expired and wasted doses at least every 12 months.	Texas Department of State Health Services Vaccine Management webpage	Not Present
2.1.6 No more than 5% of vaccines should become expired or wasted.	Texas Department of State Health Services Vaccine Management webpage	Not Present
2.1.7 Apportion vaccine purchases appropriately by funding source.	Texas Department of State Health Services Vaccine Management webpage	Present
2.1.8 Annual vaccine spending plan	Texas Department of State Health Services Vaccine Management webpage	Not Present
2.1.9 Vaccine accountability plan	Texas Department of State Health Services Vaccine Management webpage	Present
2.1.10 Financial support for WIC screening and referral areas.	Texas Administrative Code, Title 25, chapter 31.24	Present

*Department of State Health Services Fiscal Year 2006 budget*

The DSHS Fiscal Year 2006 budget complies with the IPOM's first two recommendations for affordable out-of-pocket costs. The DSHS budget allocates funding for vaccines from state revenues (component 2.1.1). The Medicaid and SCHIP allocations also supplement federal funds to cover the costs of vaccinations.

*Texas Department of State Health Services Vaccine Management webpage*

The DSHS vaccine management webpage provides information for medical providers on how to store and handle their vaccinations, how to keep a record of the state-funded vaccinations they receive, and how the DSHS handles vaccine accounting. The webpage provides information for one IPOM recommendation and that recommendation is that the DSHS apportions vaccine purchases appropriately by funding source.

The DSHS vaccine management webpage provides limited information about the recommendations from the IPOM. Therefore, an interview was conducted with a manager from the Texas Department of State Health Services Immunization Branch. The interview supplied responses that coincide with all four IPOM recommendations in question.

**Table 5.7 – Interview Responses for Intervention 2.1 – Out-of-pocket costs are affordable**

<b>Component</b>	<b>Interview question</b>	<b>Response</b>
2.1.5 Submit a request for excise tax reimbursement of expired and wasted doses at least every twelve months.	1. Does the Department of State Health Services submit a request for excise tax reimbursement of expired and wasted doses at least every twelve months?	Present
2.1.6 No more than 5% of vaccines should be expired or wasted	2. Is the annual percentage of wasted vaccines less than 5%?	Present
2.1.8 Annual vaccine spending plan	3. Does the state of Texas have an annual vaccine spending plan?	Present
2.1.9 Vaccine accountability plan.	4. Does the state of Texas have a vaccine accountability plan?	Present

**Multicomponent interventions that include expanding access in healthcare settings.** Expanding access in healthcare settings provides more immunization opportunities. Extended hours in a healthcare setting provide greater access for patients who cannot go to a healthcare setting during the day because of employment or lack of transportation. The more opportunities presented to a patient, the more likely a child will be immunized.

Expanding clinic hours has only proved effective when other interventions are used as well. Document analysis provides evidence that Texas uses the client



reminder/recall intervention. Document analysis for the client reminder/recall is shown in Table 5.1 and Table 5.2.

Document and content analysis were used to investigate whether publicly-funded Texas clinics expand their hours of operation and therefore expand access in healthcare settings. The document and content analyses show that three different publicly-funded programs in Texas expand their clinic hours for immunization services.

**Table 5.8 Document and Content analyses for Intervention 2.2 – Multicomponent interventions that include expanding access in healthcare settings**

<b>Component</b>	<b>Document</b>	<b>Measurement</b>
2.2.2 Clinics provide additional services outside routine clinic hours.	Annual Report on Plans to Increase Immunization Rates in Texas.	Present
	Migrant Health Promotion website	Present
	The Texas Women, Infants, and Children website	Present

*Annual Report on Plans to Increase Immunization Rates in Texas*

The DSHS Annual Report includes information about funding for Migrant Health Centers. The DSHS funds these health centers that provide services “in a manner that eliminates barriers to appropriately immunizing children and adolescents.” Eliminating barriers, in this case, includes providing immunization services outside usual clinic hours.

*Migrant Health Promotion Website*

The Migrant Health Promotion website provides information about expanding access in healthcare centers along the Texas/Mexico border. The Migrant Health centers are partially funded by the Texas Department for State Health Services and therefore coincide with the practical ideal type recommendation.

*Texas Women, Infants, and Children (WIC) website*

The Texas WIC website is hosted on the Texas Department of State Health Services website. The Texas WIC also satisfies component 2.2.2 of the practical ideal type because the WIC healthcare centers provide immunizations outside of regular business hours.

**Vaccination interventions in nonmedical settings.** Vaccination interventions in nonmedical settings allow for the vaccination message to come to the public. Vaccination interventions, when conducted in areas where underserved populations congregate, have been proven to increase immunization rates. Document analysis shows that Texas adheres to each of the four Immunization Program Operations Manual (IPOM) components.

**Table 5.9 – Document analysis for Intervention 2.3 – Vaccination interventions in nonmedical settings.**

<b>Component</b>	<b>Document</b>	<b>Measurement</b>
2.3.1 support school clinics	2004 Annual Report on School-Based Health Centers	Present
2.3.2 Link services with other public health and social services agencies	Texas Administrative Code, Title 25, chapter 31.24	Present
2.3.3 Collaborate with community-based organizations (churches, schools, child care facilities) to identify, refer, and follow-up on vaccinations.	Annual Report on Plans to Increase Immunization Rates in Texas (SVFC)	Present
	Texas Immunization Coalitions webpages	Not Present
2.3.4 Outreach efforts between public clinics and community organizations.	SB 486 of the 78th Texas Legislature	Present

*2004 Annual Report on School-Based Health Centers*

School-based health centers (SBHC) are centers near a school that offer healthcare services to students. The students not only receive their well-child exams from the SBHCs, but also can receive the immunizations that are required for school entrance. In Cedar Ridge Charter School in Galveston, Texas, 100% of the students are enrolled in their SBHC. During 2004, the Texas Department of State Health Services funded seven SBHC projects. For the purpose of this study, the SBHCs comply with the recommendation from the IPOM for a state to support school clinics.

*Texas Administrative Code, Title 25, chapter 31.24*

The Texas Administrative Code (TAC), Title 25, chapter 31.24 requires that Women, Infants, and Children (WIC) clinics receive funding for immunizations. Therefore, the TAC adheres to the IPOM recommendation to link immunizations services with other public health and social services agencies (component 2.3.2).

*Annual Report on Plans to Increase Immunization Rates in Texas (2004)*

The Annual Report provides information about the state of Texas funding for Seniors and Volunteers for Children (SVFC) programs. The SVFC program volunteers followup with new mothers to ensure that they are taking their children to be immunized. The Texas Department of State Health Services partnership with the SVFC program satisfies the IPOM recommendation to collaborate with community-based organizations (component 2.3.3).

*Senate Bill 486 of the 78<sup>th</sup> Texas Legislature*

Senate Bill (SB) 486 mandates public-private partnerships in Texas to increase the awareness of childhood immunizations. SB 486 mandates that Texas DSHS works with community-based organizations such as teacher organizations, the United Way, schools, local businesses, chambers of commerce, and athletic booster clubs, among others to increase the awareness and participation in childhood vaccinations. SB 486 satisfies IPOM's recommendation for outreach efforts between public clinics and community organizations (component 2.3.4).

### **Intervention Three – Provider-Based Interventions**

**Functional Provider Reminder/Recall.** Provider reminder/recalls alert the medical provider when certain children are due for vaccinations. Document analysis in Table 5.1 shows that the ImmTrac system provides a reminder/recall function. Therefore, Texas complies with the Briss et al. (2000) recommendation for a provider reminder/recall.

**Provider Assessment and Feedback for Vaccination Providers.** Provider assessment and feedback is important because physicians can overestimate the immunization rates of their patients, thinking that more patients are up-to-date on their immunizations than really are (IOM 2000). The overestimation of immunization rates can be a problem in that physicians are missing opportunities to administer vaccinations because they already believe that their patients have received the recommended vaccinations. Therefore, assessment and feedback of providers can be a useful tool for provider-based interventions.

Content analysis of the AFIX/CASA webpage shows that Texas uses an AFIX program to provide assessment and feedback to its providers.

**Table 5.10 – Content Analysis for Intervention 3.2 – Provider Assessment and Feedback**

<b><i>Component</i></b>	<b><i>Document</i></b>	<b><i>Measurement</i></b>
3.2 Assessment and feedback for vaccination providers	AFIX/CASA webpage	Present

### *AFIX/CASA webpage*

The AFIX/CASA webpage is hosted on the Texas Department of State Health Services webpage. Texas contracts with the Texas Medical Foundation to conduct annual quality assurance site reviews with each of the providers who use state-funded vaccinations. The webpage provides an explanation that AFIX is “an assessment methodology to evaluate the vaccination levels and practices using Clinic Assessment Software Application (CASA).” The AFIX/CASA methodology satisfies the Briss et al. (2000) recommendation for provider assessment and feedback.

### **Summary**

The purpose of this chapter was to present and analyze the data outlined in chapter IV that compares Texas’ immunization infrastructure to the practical ideal type developed in chapter III. The data were collected by using document analysis, content analysis, and an interview.

Three overall interventions are identified through the practical ideal type and are broken down into measurable components. The components are connected to the literature review and create the development of the data collection outlined in chapter IV.

The next chapter summarizes the data analysis results found in this chapter and provides recommendations for Texas’ immunization infrastructure.



## **Chapter VI – Conclusion**

The purpose of this Applied Research Project was threefold. First, the purpose was to establish a model approach, based on literature, for improving childhood immunization rates in a state. The second was to compare the model approach to the current childhood immunization infrastructure in Texas. The third was to make recommendations for Texas based on the model approach and the results of the data analysis.

Chapter III achieves the first purpose by establishing a model approach through a literature review. Chapter V achieves the second purpose of this research project, which is to compare Texas' immunization infrastructure with the model approach.

This chapter addresses the third purpose, which is to make recommendations (if appropriate) for Texas in an effort to strengthen its immunization infrastructure. This Applied Research Project is a broad look at Texas' immunization infrastructure. Therefore, the recommendations are also broad. A more specific look at elements of Texas' immunization infrastructure may uncover more weaknesses in the specifics of Texas' immunization practices and policies.

### **Summary of Weaknesses**

Document analysis shows that nine components of the twelve recommended by the National Immunization Program (NIP) are met by Texas' immunization registry. The Texas registry is not mandated by law to store all NVAC – approved core data elements. The Texas registry does not establish a registry record within six weeks of birth for each newborn child because of the registry's parental consent requirement, nor does the registry exchange immunization records using the Health Level Seven standards.



None of the three educational immunization materials studied during document and content analyses met all six of the requirements of the Immunization Program Operations Manual (IPOM). The IPOM's recommendation to educate parents about the responsibility of maintaining an immunization record and bringing it to all provider visits was not met by any of the three Texas educational immunization materials studied in this applied research project.

The school immunization requirements in Texas are not complete according to the requirements set by the Advisory Committee on Immunization Practices (ACIP). Texas requires only four of the nine recommended by ACIP.

Texas does not have legislation in place that requires insurance coverage for immunizations. Therefore, Texas does not have all components recommended by the Immunization Program Operations Manual (IPOM) to meet the Access to Vaccinations component in the practical ideal type.

Table 6.0 provides a summary of the data analysis findings. Table 6.1 provides recommendations on how Texas' immunization infrastructure can be improved.

**Table 6.0 Results**

<b>CONCEPTUAL FRAMEWORK</b>	<b>RESULTS</b>
<b>Intervention 1: Community Demand for Vaccinations</b>	
<b>1.1 Functional Immunization Registry</b>	
1.1.1 Electronically store data on all NVAC - approved core data elements	Does not exist
1.1.2 Establish a registry record within 6 weeks of birth for each newborn child born in the catchment area	Does not exist
1.1.3 Enable access to and retrieval of immunization information in the registry at the time of encounter	Exists
1.1.4 Receive and process immunization information within 1 month of vaccine administration	Exists
1.1.5 Protect the confidentiality of health care information	Exists
1.1.6 Ensure the security of health care information	Exists
1.1.7 Exchange immunization records using Health Level Seven (HL7) Standards	Does not exist
1.1.8 Automatically determine the routine childhood immunization(s) needed, in compliance with current ACIP recommendations, when an individual presents for a scheduled immunization	Exists
1.1.9 Automatically identify individuals due/late for immunization(s) to enable the production of reminder/recall notifications	Exists
1.1.10 Automatically produce immunization coverage reports by providers, age groups, and geographic areas	Exists
1.1.11 Produce official immunization records	Exists
1.1.12 Promote accuracy and completeness of registry data	Exists
<b>1.2 Multicomponent interventions that include education.</b>	
1.2.1 Must use with at least one of the following activities to improve vaccination coverage: client reminders, provider education, expanded hours or access in clinical settings, provider reminders, reduce out-of-pocket costs, client-held vaccination records, WIC interventions, nutrition services, or home visits.	Present
1.2.2 Work with hospitals, health maintenance organizations, laboratories and/or large group practices to involve in partnerships to promote and provide patient immunization education programs.	Present
1.2.3 Local television and radio network affiliates facilitate delivery of immunization-related health messages to community.	Present
1.2.4 Messages to consumers are relevant according to IPOM standards	Not Present
<b>1.3 Vaccination requirements for childcare and school attendance</b>	
1.3.1. Vaccination requirements that coincide with ACIP standards	Not Present

**Table 6.0 continued**

Intervention 2: Access to Vaccination Services	
<b>2.1 Affordable out-of pocket costs.</b>	
2.1.1 Funding for vaccine from state and local revenues	Present
2.1.2 Medicaid and SCHIP supplement 317 and VFC grants to cover the cost of all ACIP-recommended vaccines for underserved populations	Present
2.1.3 Legislation or regulations that require insurance coverage for immunization	Not Present
2.1.4 Local health departments are reimbursed for vaccines and vaccine administration costs	Present
2.1.5 Submit a request for excise tax reimbursement of expired and wasted doses at least every 12 months.	Present
2.1.6 No more than 5 % of vaccines should become expired or wasted	Present
2.1.7 Apportion vaccine purchases appropriately by funding source.	Present
2.1.8 Annual vaccine spending plan	Present
2.1.9 Vaccine accountability plan	Present
2.1.10 Financial support for WIC screening and referral areas	Present
<b>2.2 Muticomponent interventions that include expanding access in health care setting.</b>	
2.2.1. Must use with at least one of the following activities to improve vaccination coverage: client reminders, provider education, expanded hours or access in clinical settings, provider reminders, reduce out-of-pocket costs, client-held vaccination records, WIC interventions, nutrition services, or home visits.	Present
2.2.2 Clinics provide additional services outside routine clinic hours	Present
<b>2.3 Vaccination interventions in nonmedical settings</b>	
2.3.1 Support School clinics	Present
2.3.2 Link services with other public health and social service agencies (WIC, Medicaid, SCHIP) to provide immunization services as well.	Present
2.3.3 Collaborate with community-based organizations (churches, schools, child care facilities) to identify, refer, and follow-up on vaccinations	Present
2.3.4 Outreach efforts between public clinics and community organizations	Present

Intervention 3: Provider-Based Interventions	
<b>3.1 Functional Provider Reminder/Recall</b>	Present
<b>3.2 Assessment and Feedback for Vaccination Providers</b>	Present

**Table 6.1 Recommendations**

<b>Component</b>	<b>Degree of Completion</b>	<b>Recommendation</b>
1.1 Functional Immunization Registry	Somewhat	ImmTrac, the Texas Immunization Registry, meets nine of the twelve NIP-recommended components of a functional immunization registry. The Texas Legislature needs to pass legislation that mandates each of the missing three components to ensure a functional registry. The Texas registry would include more of Texas's children if it was an "opt-out" registry as opposed to its current status as an "opt-in" registry.

**Table 6.1 Continued**

<b>Component</b>	<b>Degree of Completion</b>	<b>Recommendation</b>
1.2. Multi-component interventions that include education.	Somewhat	Each immunization educational material developed by state health agencies should include the recommendations of the IPOM. Each material reviewed in this research project had one thing in common -it lacked the recommendation to emphasize the importance of an up-to-date immunization record. This recommendation is especially important in Texas as the Texas immunization registry requires parental consent for entry and therefore, fewer children are entered than in those states that require no parental consent. Until every child in Texas is entered into the immunization registry, emphasis on the importance of a maintained immunization record is essential.
1.3 Vaccination requirements for childcare and school attendance	Somewhat	The school vaccination requirements in Texas should meet the ACIP vaccination requirements. The National Immunization Survey, as mentioned in Chapter II, measures the immunization rates of states according to the ACIP recommended immunizations. In order for Texas to have better immunization rates in the NIS, schools should require these vaccinations for attendance.

**Table 6.2 Continued**

<b>Component</b>	<b>Degree of Completion</b>	<b>Recommendation</b>
2.2 Multicomponent interventions that include expanding access in healthcare settings.	Complete	No recommendation
2.3 Vaccination interventions in nonmedical settings	Complete	No recommendation
3.1 Functional Provider Reminder/Recall	Complete	No recommendation
3.2 Assessment and Feedback for Vaccination Providers	Complete	No recommendation

## Bibliography

- Adler, Jerry. 2005. The fight against the flu. *Newsweek* October 31, 2005: 39-45
- Altemeyer, Lynn. 2004. An Assessment of Texas State Government Implementation of Enterprise Risk Management Principles. Applied Research Project, Texas State University
- American Academy of Pediatrics. 2003. Policy statement, increasing immunization coverage. *Pediatrics* 112(4): 993-996
- Barry, John M. 2004. *The great influenza*. London, England: Penguin Books
- Bellanti, Joseph A. 1990. Basic immunologic principles underlying vaccination procedures. *The Pediatric Clinics of North America* 37(3): 513-531
- Briss, P.A., S. Zaza, and M. Pappionau. 2000. Reviews of evidence regarding interventions to improve vaccination coverage in children, adolescents, and adults. *American Journal of Preventive Medicine* 18(1S): 97-140
- Bumpers, Betty et al. 2004. Closing the vaccination gap: A shot in the arm for childhood immunization programs. *Every Child by Two Organization Issue Report*
- Centers for Disease Control (CDC). 2001. "Immunization registry minimum functional standards," [www.cdc.gov](http://www.cdc.gov)
- Centers for Disease Control (CDC). 2004. "Core elements for AFIX training and implementation," [www.cdc.gov](http://www.cdc.gov)
- Centers for Disease Control (CDC). 2005a. "Adolescent vaccination," [www.cdc.gov](http://www.cdc.gov)
- Centers for Disease Control (CDC). 2005b. "Assessment, Feedback, Incentives, and eXchange of Information (AFIX) Standards" [www.cdc.gov](http://www.cdc.gov)
- DeQuadros, C.A. 1980. More effective immunization [and discussion]. *Proceedings of the Royal Society of London* 209(1174): 111-118
- Fairbrother, Gerry et. al. 2000. Findings from case studies of state and local immunization programs. *American Journal of Preventive Medicine* 19(3S): 54-77
- Freed, G.L., S.J. Clark and A.E. Cowan. 2000. State-level perspectives on immunization policies, practices, and program financing in the 1990s. *American Journal of Preventive Medicine* 19(3S): 32-44
- Institute of Medicine (IOM). 2000. *Calling the Shots*. Washington D.C.: National Academy Press



- Institute of Medicine (IOM). 2003 Financing vaccines in the 21<sup>st</sup> century: assuring access and availability. *National Academy of Sciences*
- Katz, S.L. and B.G.Gellin. 1994. Measles vaccine” do we need new vaccines or new programs? *Science* 265 (5177): 1391-1392
- McLaughlin, E. 2001. Peer training on nurses improves immunization coverage and practices. *International Family Planning Perspectives* 27(4): 211-212
- Meyerhoff, A.S. and R.J. Jacobs. 2005. Do too many shots dues lead to missed vaccination opportunities? Does it matter? *Preventive Medicine* 41: 540-544
- National Immunization Program (NIP). 2003. Immunization Program Operations Manual. Printed from the Centers for Disease Control and Prevention Website.
- O’Connor, M.L. 1999. Children’s vaccine coverage improves when it is linked to frequency food voucher distribution. *Family Planning Perspectives*. 31(3): 153-154
- Pham, Kim, 2004. Introducing the Scorecard to Pharmacy Benefit Managers. Applied Research Project, Texas State University
- Ruiz, Albert. 2004. An Exploratory Study of the Transformation Underway in Texas’ Health and Human Services Delivery System. Applied Research Project. Texas State University
- Shields, P.M. and H. Tajalli. 2005. Intermediate theory the missing link in successful student scholarship. Paper presented at the 2005 Annual Conference of the National Association of Schools of Public Affairs and Administration. Washington D.C.
- Smith, Philip J. et al. 2001. Overview of the sampling design and statistical methods used in the national immunization survey. *American Journal of Preventive Medicine* 20(4S) : 17-24
- Streatfield, K., M. Singarimbunm and I. Diamond. Maternal education and child immunization. *Demography*. 27(3): 447-455
- Texas Department of Health (TDH). 2004. Cost-benefit analysis of commonly used vaccines
- Texas Department of Health (TDH). 2003a. Process explained for claiming conscientious objection for vaccinations. News Release

- Texas Department of Health (TDH). 2003b. Rider 35: Report to the legislative budget board and the Governor on plans to increase immunization rates in Texas submitted September 30, 2003. 78<sup>th</sup> Legislature, regular session
- Texas Medical Association. 2002. Immunization policy paper
- Udall, Pam and Brent Annear. 2005. Doctors probe drop in Texas' vaccination rates. Printed from the Texas Medical Association Web site. 1-2
- Winikoff, Beverly. 1978. Nutrition, population and health: some implications for policy. *Science* 200(4344) 895-902
- Yawn, Barbara P., et al. 1998. The impact of a simulated immunization registry on perceived childhood immunization status. *The American Journal of Managed Care* 4(2): 185-192
- Yin, Robert K. 2003. *Case study research, design and methods*. 3<sup>rd</sup> ed. Thousand Oaks, CA: Sage

